VOLUME 2 **Technical Appendixes**

Removal Site Assessment Report



Reynolds Metals Company TROUTDALE FACILITY OPERABLE UNIT 1



JANUARY 1995

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Contents

Appendix A	Soil and Groundwater Tracking Data Tables
Appendix B	Soil and Test Pit Logs
Appendix C	Geo Recon Electrical Resistivity Survey Report
Appendix D	Monitoring Well Geologic Logs and Well Construction Diagrams
Appendix E	RMC Production Well and Sampled Offsite Well Geologic and Well Drillers' Logs
Appendix F	Quality Assurance Sampling Plan

Appendix A Soil and Groundwater Tracking Data Tables

Soil Tracking Data Tables

Matrix	Sample ID	Collection Date	Add. Anal. Date	Beg depth	 End depth	Lab #	Lab Results In (a)	Cyanide-Total	Fluoride	Hardness	Metals-13(PP)	Metals-23(CLP)	Metais-Dissolved	РАН	TPAH-S	ьсв	PCB-S	Pesticides-Chlor.	TCLP	тос	трн	TPH 418_1	TPH-11 glass	TPH-S	TPH-VOA bottle
-	North Landfill		8																						
_	E-H-W1	6/20/94		0		94-1672										X			X						igwdap
	E-H-W2	6/20/94		0		94-1672										X			Х						
	E-H-W3	6/20/94		0		94-1672										Χ			Х						
	E-H-W4A	6/20/94		0		94-1672				·											X				\square
	E-H-W5	6/20/94		0		94-1672										X			Χ				_ `	لــــــا	
	S-H-N3A	6/20/94		0	0	94-1672	F														Х				
		West Ar	ea																						
	EHW1-C	7/20/94		0		94-2017		X	X		X				X		X								
	EHW1-C	7/20/94	8/1/94	0		94-2017										X									
	EHW1-S	7/20/94	8/1/94	0		94-2017											X							<u> </u>	
	EHW1-2	7/20/94	8/1/94	2		94-2017											X			L					Ш
	EHW1-5	7/20/94	8/1/94	5		942017							<u> </u>				X								
	EHW2-C	7/20/94		0		94-2017		Х	X		X				X		X							ļ	Ш
	EHW2-C	7/20/94	8/1/94	0		94-2017										X					L.				
	EHW2-S	7/20/94	8/1/94	0		94-2017							<u> </u>				X							<u> </u>	
	EHW2-2	7/20/94	8/1/94	2		94-2017							<u> </u>				X							<u> </u>	
	EHW2-5.5	7/20/94	8/1/94	5.5		94-2017							<u> </u>	L			X							ļ	
	EHW3-C	7/19/94		0		94-2007		X			X		<u> </u>		Х		Χ							<u> </u>	
S	SHN1-C	7/20/94		0		94-2017		X	X		X				X		X								
	SHN2-C	7/20/94		0		94-2017		X	X		X				Х		X			<u> </u>	·			ļ	
	SHN3-C	7/20/94		0		94-2017		Χ	X		X				X		X			<u> </u>				Ĺ	
S	SHN4-C	7/18/94		0	0	94-2007	F	X	X		X				X		Х								
	South Potline																								
	SP1-C	7/20/94	8/1/94	0		94-2017																X			
S	SP1-C	7/20/94		0		94-2017		X	X			L			X		X	<u> </u>		L				L	
	SP2-C	7/20/94	8/1/94	0		94-2032								X	L			ļ			ļ				
S	SP2-C	7/20/94		0		94-2032		X	X		X		<u> </u>		X		X							<u> </u>	
S	SP2-2.5	7/20/94	8/1/94	2.5		94-2032									X										
S	SP2-5.0	7/20/94	8/1/94	5		94-2032							ļ	<u> </u>	X									<u> </u>	igsquare
S	SP3-C	7/21/94		0		94-2032		X			X		<u> </u>		X		X							<u> </u>	
S	SP3-CD	7/21/94		0		94-2032		X			X	<u> </u>	ļ	ļ	X		X	<u> </u>			<u> </u>				
S	SP4-C	7/21/94		0	0	94-2032	F	X	X	<u> </u>	X		ļ		X		X				<u> </u>			<u> </u>	$ldsymbol{ldsymbol{ldsymbol{eta}}}$
	SP4-C	7/21/94				94-2032		•		<u> </u>		ļ	 	Х				<u> </u>		<u> </u>		<u> </u>		<u> </u>	
S	SP4-3.0	7/21/94				94-2032				ļ		<u> </u>	<u> </u>		X		<u> </u>	<u> </u>		L	<u> </u>			<u> </u>	Ш
S	SP5-C	7/21/94		0		94-2032		X	X		X		ļ		X		X								
S	SP5-3.0	7/21/94				94-2032				<u> </u>		<u> </u>		<u> </u>	X			ļ		 				<u> </u>	\square
<u>S</u>	SP6-C	7/21/94		0		94-2032			X		X	ļ	ļ	ļ	X		X			ļ			L	<u> </u>	Ш
S	SP6-CD	7/21/94		0		94-2032		X	X	<u> </u>	X		ļ		X		X	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		 	
S	SP6-CD	7/21/94				94-2032				<u> </u>			<u> </u>	X				<u> </u>			ļ	<u> </u>		<u> </u>	\sqcup
<u>s</u>	SP6-3.0	7/21/94				94-2032				<u> </u>	1.		 	ļ	X		1.0	<u> </u>				<u> </u>		<u> </u>	\sqcup
S	SP7-C	7/21/94		0		94-2032		X	X		X	<u> </u>	_	<u> </u>	X		X					<u> </u>		 	↓
S	SP7-2.5	7/21/94				94-2032			<u> </u>				1	<u> </u>	X					ļ					
S	SP8-C	7/21/94		0		94-2032		X	X		X	<u> </u>	ļ		X		X	<u> </u>		<u> </u>					
S	SP8-2.5	7/21/94				94-2032				<u> </u>		<u> </u>			X		- .,	<u> </u>		 					├ —
	SP9-C	7/21/94		0		94-2032		X	X		X	<u> </u>	<u> </u>	_	X		X		<u> </u>	<u> </u>	<u> </u>	_		<u> </u>	\sqcup
	SP9-2.5	7/21/94				94-2032				ļ		<u> </u>	-	-	X		X			<u> </u>	<u> </u>				
	SP9-5.0	7/21/94				94-2032			**	 	1	<u> </u>		_	X		X	<u> </u>		<u> </u>				—	
	SP10-C	7/21/94		0		94-2032		X	Х	<u> </u>	X	<u> </u>	 	V	X	37	X							<u> —</u>	\vdash
	SP10-C	7/21/94				94-2032			-			<u> </u>		X	V	X				 	-				\vdash
	SP10-4.0 SP11-C	7/21/94				94-2032		·	~	ļ	V	<u> </u>	├		X		X	ļ		<u> </u>		ļ		\vdash	\vdash
s	10111-0	7/21/94		0	U	94-2032	<u> </u>	Ā	X	<u> </u>	X	<u>L</u>	<u> </u>	L	<u> </u>	<u> </u>	X	<u> </u>	<u> </u>	<u> </u>					Ļ

Watrix	Sample ID	Collection Date	Add. Anal. Date	Beg depth	End depth	Lab #	Lab Results In (a)	Cyanide-Total	Fluoride	Hardness	Metals-13(PP)	Metals-23(CLP)	Metals-Dissolved	РАН	TPAH-S	ьсв	PCB-S	Pesticides-Chlor.	TCLP	тос	ТРН	TPH 418_1	TPH-11 glass	трн-ѕ	TPH-VOA bottle
	Additional Sou					04.0040	_				<u></u>			v	v										
	B2-2	9/13/94		2		94-2643 94-2643								X	X	X	х								
<u>s</u>	B2-4 B2-6	9/13/94	9/10/94	6		94-2643								Ŷ	^	Ŷ					-				-1
	B2-6	9/13/94	0/15/04	6		94-2643							,	^	X		X								
S_	B2-0 B2-C	9/13/94	3/13/84	0		94-2643		Х	X		X				Ŷ		Ŷ								
S	B2-C	9/13/94	0/15/04	0		94-2643		^	^		- 			х							-				
S	C1.5-C	9/13/94	0/10/04	0		94-2643		X	Х		X			^	Х		X								
	C1.5-C	9/13/94	9/15/94	o		94-2643		^	^		^			X	_^		^								
	C1-5.6	9/13/94	0110137	6		94-2643					-			$\hat{\mathbf{x}}$		Х					-				
S	C1-5.6		9/15/94	6		94-2643								^	Х	^	X	-							
s	D4-6	9/13/94	07 (0.0)	6		94-2643					-1			X	<u> </u>	X	<u> </u>	-			 				
S	D4-6		9/15/94	6		94-2643									X		X		 	 	 				
s	D4-8	9/13/94		8		94-2643								X											
S	D4-8	9/13/94		8		94-2643										X				_					
S	D4-8		9/15/94	8		94-2643									X		X								
S	D4-C	9/13/94		0	0	94-2643	F	Χ	X		X				X		X								
S	D4-C	9/13/94	9/15/94	0	0	94-2643	F							X											
S	E2-C	9/13/94		0	0	94-2643	F	X	X		Х				X		X								
S	E2-C		9/15/94	0		94-2643								X											
S	E5-C	9/13/94		0		94-2643		X	X		Х				X		X								
s	E5-C	9/13/94	9/15/94	0	0	94-2643	F							X											
	East Potliner																								
	EP1-S		9/27/94	0		94-2047											X								_1
	EP2-S		9/27/94	0		94-2047											X				ļ				
S	EP3-S		9/27/94	0		94-2047											X								
S	EP4-S		9/27/94	0		94-2047											X								
S	EP5-S	7/22/94		0		94-2047											X	 	ļ			<u> </u>			
S	EP6-S EP7-S		9/27/94	0		94-2047									 		X		 	<u> </u>	ļ				
S	EP8-S		9/27/94	0		94-2047											×		-						
S S	EP1-C	7/22/94	9/2//94	0		94-2047		X	Х						X		^								
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	EP4-C	7/22/94		. 0		94-2047		X		-					X			_	-						
1	EP5-C	7/22/94		. 0		94-2047		X							X			-		_					
	EP6-C	7/22/94		0		94-2047		X	X						X										
	EP7-C	7/22/94		0		94-2047		X							X										
s	EP8-C	7/22/94		0	0	94-2047	F	X							X										
	Cryolite Ponds																								
	CP1-C	7/25/94		. 0		94-2060		X							X		X								
	CP1-5.0	7/25/94		5		94-2060			Χ																
	CP1-C	7/25/94	9/9/94	0		94-2060					X														
S	CP2-C	7/25/94		0		94-2060		X							X		X			<u> </u>	<u> </u>				
	CP2-C	7/25/94	9/9/94			94-2060					X							<u> </u>			<u> </u>		ļ. <u></u> .		
	CP2-10.5	7/25/94	0/0/0	10.5		94-2060		X							X		X	<u> </u>			<u> </u>				
3	CP3-S	7/25/94	8/3/94	0		94-2060		X	X						X	ļļ	X	 	 		<u> </u>				
	CP3-S	7/25/94	9/9/94			94-2060		-U	X		-				V	<u> </u>	.,								_J,
	CP3-1.2	7/25/94				94-2060		X	V		V				X	\vdash	X				<u> </u>				1
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	CP4-5 CP4-2.5	7/25/94				94-2060		х	^		\dashv				х		Х		-	_					I T
	CP4-2.5 CP4-2.5	7/25/94				94-2060		^	Х		Х				-			 	 -	<u> </u>	-				
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Matrix	Sample ID Collection Date	Add. Anal. Date	Beg depth	End depth .	# qe	ab Results In (a)	Syanide-Total	Fluoride	Hardness	Metals-13(PP)	Metals-23(CLP)	Metals-Dissolved	ЭАН	rpah-s	РСВ	PCB-S	Pesticides-Chlor.	TCLP	roc	ГРН	IPH 418_1	TPH-11 glass	TPH-S	TPH-VOA bottle
	7/28/94	<u> </u>	0		94-2101		X	X	<u> </u>	-2	_2_	-2	<u> </u>	X	-	X	0_			-				出
		9/9/94	0		94-2101		^		-	X					-	^		-						$oldsymbol{oldsymbol{\sqcup}}$
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S CP6-C	7/28/94	0/0/04					^			-		-				^		-				-		\blacksquare
S CP6-C	7/28/94	9/9/94	0		94-2101					X		<u> </u>												
S CP6-3.0	7/28/94	9/9/94	3	3	94-2101	<u> </u>		X													_			igwdown
Parking Lot																								igspace
S P1-1-3	7/25/94		1		94-2060		Χ							X		X	<u> </u>							Ш
S P1-3-5	7/25/94		3		94-2060		Χ							X		X								
S P1-5-7	7/25/94		5		94-2060		X							X		Х							<u></u> '	
S P2-1-3	7/25/94		1		94-2060		X							X		X			L				ļ	ш
S P2-3-5	7/25/94		3		94-2060		X							X		X	<u> </u>	ļ		<u> </u>			ļ	\sqcup
S P2-5-7	7/25/94		5		94-2060		X	<u> </u>	ļ					X		X		<u> </u>	<u> </u>				ļ!	
S P3-1-3	7/25/94		1		94-2060		X	L				ļ		X		Х	ļ	ļ					ļ!	Ш
S P3-3-5	7/25/94		3		94-2060		X							X		Х	ļ	ļ					ا 'ا	\sqcup
S P3-5-7	7/25/94		5		94-2060		Х	L						Х		X	<u> </u>			\sqcup			لــــــا	
S P4-1-3	7/25/94		1		94-2060		X	<u> </u>				ļ		X		X	L	ļ	<u> </u>				!	<u> </u>
S P4-3-5	7/25/94		3		94-2060		X	ļ						X		X		 						<u> </u>
S P4-5-7	7/25/94		5	7	94-2060	F	Х	<u> </u>			<u> </u>			Х		Х		<u> </u>					<u></u>	Ш
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s sw1-c	7/26/94		0		94-2070		X	X				ļ		X		X	X	<u> </u>						Ш
S SW1-C	7/26/94	8/1/94	0		94-2070			Ĺ															X	
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S SW2-C	7/26/94		0		94-2070		X	X						X		X	X	<u> </u>					<u> </u>	\sqcup
S SW2-C	7/26/94	8/1/94	0		94-2070			<u> </u>	ļ									<u> </u>			X		<u> </u>	
S SW2-C	7/26/94	9/9/94	0		94-2070		3.5			X		<u> </u>		14			1	<u> </u>					<u> </u>	<u> </u>
S SW3-C	7/26/94	0/4/04	0		94-2070		Χ.	, X						X		X	X							├ —
S SW3-C	7/26/94 7/26/94	8/1/94	0		94-2070		ļ			V		-						ļ					X	
S SW3-C S SW4-C	7/25/94	9/9/94	0		94-2070 94-2070		V	-	-	X		 		v		X	-	 						┼┼┦
S SW4-C	7/25/94	8/1/94	0		94-2070		X	X	-			 		X	 	-	X	<u> </u>	ļ	-			х	┼╌┦
S SW4-C	7/25/94	9/9/94	0		94-2070			 	-	Х	 	├						-					-	\vdash
S SW5-C	7/25/94		0		94-2070		Х	X	-	_		╂		X		X	X	-	 	\vdash			\vdash	┼╌┦
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S SY1-C	7/25/94	·	0	0	94-2060	F		—		·		-		Х	_		-	-	_			•	-	\vdash
S SY1-C	7/25/94		0		94-2060		Y	X	 		-	1	X	^		X	 	 		\vdash			_	
S SY1-2.0	7/25/94		2		94-2060		<u> </u>	 ^	 	 	 	 	 ^	X	 	<u> </u>		 	 	-			 	
S SY1-4.0	7/25/94		4		94-2060			 				T		X	,		 		 			\vdash		
S SY2-C	7/25/94		Ō		94-2060		-	 		 		1	-	X	_		\vdash		\vdash					
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S SY2-C	7/25/94				94-2060		X	X				1				<u> </u>						$\neg \neg$		\sqcap
S SY2-2.0	7/25/94				94-2060		<u> </u>	Ė						Х				Ė						
S SY2-4.0	7/25/94				94-2060		<u> </u>		T					X		<u> </u>								
S SY3-C	7/25/94		0		94-2060		X	X						X		X			 					
S SY3-C	7/25/94				94-2060					X								Г						
S SY4-C	7/26/94		0		94-2070									X										\Box
S SY4-C	7/26/94		0		94-2070		X	X								X								
S SY5-C	7/26/94		0		94-2070					X				X										
S SY5-C	7/26/94	8/1/94	0		94-2070		X	X								X								
S SY6-S	7/26/94		0	0	94-2070	F								X										
S SY6-S	7/26/94		0		94-2070		X	X								X								
S SY7-S	7/26/94		0		94-2070									Χ										
S SY7-S	7/26/94		0		94-2070		X	X																
S SY7-S	7/26/94	8/1/94	0	0	94-2070	F										X								

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Matrix	Sample ID	Collection Date	Add. Anal. Date	Beg depth	End depth	Lab #	Lab Results In (a)	Cyanide-Total	Fluoride	Hardness	Metais-13(PP)	Metals-23(CLP)	Metals-Dissolved	PAH	TPAH-S	ьсв	PCB-S	Pesticides-Chlor.	TCLP	roc	ТРН	TPH 418_1	TPH-11 glass	TPH-S	TPH-VOA bottle
S	SY8-C	7/26/94		0	0	94-2070	F				X				X										
S	SY8-C	7/26/94	8/1/94	0	0	94-2070	F										X								
S	SY8-C	7/26/94	8/1/94			94-2070		X	X																
S	SY9-C	7/26/94		0		94-2070									X										L
S	SY9-C	7/26/94	8/1/94	0		94-2070		X	X								X								_
S	SY10-C	7/26/94		0		94-2070									X										
S	SY10-C	7/26/94	8/1/94	0		94-2070		Х	Х								X								_
S	SY11-C	7/26/94	- 11 to 1	0		94-2070									X										
S	SY11-C	7/26/94	8/1/94	0		94-2070		X	X						-,-		X							—	
<u>s</u>	SY12-C	7/25/94	0/4/04	0		94-2060			v						X		V								_ "
S	SY12-C SY13-C	7/25/94 7/25/94	8/1/94	0		94-2060		X	X						X		X						<u> </u>		\dashv
s s	SY13-C	7/25/94	8/1/94	0		94-2060		х	X						^		х						 -		
S	SY14-C	7/25/94	0/1/34	0		94-2060			^						Х		-						 		-
S	SY14-C	7/25/94	8/1/94	0		94-2060		Х	X	-			-	X	^		х			_			-		\dashv
	SY14-2.0	7/25/94	8/1/94	2		94-2060									Х										
s	SY14-4.0	7/25/94	8/1/94	4		94-2060		· -						-	X							-	·		-
	SY15-C	7/25/94	0.1101	0		94-2060									X			_					<u> </u>		7
	SY15-C	7/25/94	8/1/94	0		94-2060		Х	X								Х				_	<u> </u>			\dashv
	Reconnaissan		<u> </u>		<u>-</u>													_				-			-i
S	ND-1-S	8/4/94		0	0	94-2178	F	Х							Х										
	ND-2-S	8/4/94		0		94-2178		X							X										丁
	OR-1-S	8/4/94		0	0	94-2178	F	X							X										_1
S	SPWP-B	8/26/94		0		94-2441	F	X	X		X			X	X	X	X								
S	SPWP-A	8/26/94		0			F	Х	X		X			X	X	X	X								
S	SW-6-S	8/4/94		0	0	94-2178	F	Χ	X						X										
	West Field															٠.									
	WF1-2.0	9/23/94		2		94-2808		X	X																/
	WF2-2.0	9/23/94		2			F	X	X																[
s	WF3-2.0	9/23/94		2	2	94-2808	F	X	Х																
-	Sediment	2112121				0.0000	_										•							-	_
	RM-SD1	8/18/94		0		94-2359		X	X			X		X		X			·	X		 		X	
SD	RM-SD2	8/18/94		0		94-2359	F	X	X		ļ.,	X		X		X			 -	X			ļ	X	_
	RM-SD3 RM-SD4	8/18/94 8/18/94		0		94-2359		·X	X					X		X			<u> </u>	X				X	
	RM-SD5		8/19/94	0		94-2373		X	â			X	_	Ŷ		Ŷ				X			 	X	-
	RM-SD5D		8/19/94			94-2373		x	Ŷ			x		Ŷ		Ŷ			 	x		├─	-	Ŷ	-
	RM-SD6		8/19/94			94-2373		$\hat{\mathbf{x}}$	x			$\hat{\mathbf{x}}$		x		x				x			 	Ŷ	\dashv
	RM-SD7		8/19/94			94-2373		X	X			X		X		X				X				x	
	RM-SD8		8/19/94			94-2373		X	X			X		X		X			_	X	_			X	
	RM-SD9		8/19/94			94-2373		X	X			X		X		X				X				X	\dashv
	RM-SD10		8/19/94			94-2373		X	X			X		Χ		X				X				X	一.
	RM-SD11		8/19/94			94-2373		X	X			X		X		X		-		Χ				Χ	
	RM-SD12	8/18/94		0		94-2359		Χ	X			X		X		Χ				X				X	
	RM-SD13	8/18/94		0		94-2359		Х	X			X		X		X		_		Χ				X	\neg
	RM-SD14	8/18/94		0		94-2359		X	X			X		X		X				X				X	
	RM-SD14D	8/18/94		0		94-2359		X	X			X		X		X				X				X	
	RM-S15	8/18/94		0		94-2359		Х	X			X		X		X				X				X	-1
	RM-S16	8/18/94		0	0	94-2359	F	X	X			X		X		X				X				X	
	RM-S17	8/18/94		0		94-2359		Χ	X			X		Χ		X				X				Х	
SD	RM-SD18	8/19/94	8/19/94	0	0	94-2373	F	X	X			X		X		X				X				X	

Soil Tracking Data

Matrix	Semple ID	Collection Date	Add. Anal. Date	Beg depth	End depth	Lab #	Lab Results In (a)	Cyanide-Total	Fluoride	Hardness	Metals-13(PP)	Metals-23(CLP)	Metals-Dissolved	РАН	TPAH-S	PCB	PCB-S	Pesticides-Chior.	тсгр	тос	ТРН	TPH 418_1	TPH-11 glass	TPH-S	TPH-VOA bottle
-	Surface Water					04.0000		V		V		V		V		V								V	\blacksquare
SW	RM-SW1	8/18/94		0		94-2360		X	X	X		X		X		X								X	
SW	RM-SW3	8/18/94		0		94-2360		X	X	X		X		X		X								Χ	
SW	RM-SW5	8/19/94		0		94-2374		X	X			X		X		X								Х	
SW	RM-SW6	8/19/94		0	0	94-2374	F	X	X	X		X		X		X								,Χ	
SW	RM-SW10	8/19/94		0	0	94-2374	F	X	X	X		X		X		X.								X	
sw	RM-SW11	8/18/94		0	0	94-2360	F	Х	X	X		X		X		X								X	
sw	RM-SW14	8/18/94		0	0	94-2360	F	X	X	Х		Х		X		X								Х	
SW	RM-SW14D	8/18/94		0	0	94-2360	F	X	X	Х		Х		X		Х								Х	
	RM-SW18	8/19/94		0	0	94-2374	F	X	X	X		X		X		X								Х	
	liscellaneous Area																								
	Stressed Area			1															ĺ						
S	SP5-SA1-C	7/26/94	9/9/94	0	0	94-2070	F	X	X		X	_			X		X	X							
S	SP5-SA2-C	7/26/94		0	0	94-2070	F	X	X						X		X	X							
S	SP5-SA2-C	7/26/94	9/9/94	0	0	94-2070	F				X														
	Notes:																								
	(a) F = Final	results								_			ļ	ļ	 			<u> </u>	L	<u> </u>					\sqsubseteq
<u> </u>	, , ,																			<u> </u>					

Groundwater Tracking Data Tables

Appendix B
Soil and Test Pit Logs

Groundwater Tracking Data

			,				Junuwate																	
Matrix	Station ID	Sample ID		Add. Anal. Date	Beg depth	End depth	Lab#	Lab Results In (a)	Aluminum	Arsenic	Cyanide-Amen.	Cyanide-Total	Fluoride	Metals-23(CLP)	Metals-Dis.	РАН	TPAH-S	РСВ	PCB-S	Pesticide-Chlor.	svoc	TPH	TPH-S	voc
		Bake House Sump a		g Samples													-							
		RM-BS11	08/25/94		0		94-2433				X	X	Χ	X		Х					X		X	
		RM-BS16	08/25/94		0		94-2433		X	X		Χ	X			Χ					X		X	
	BS-18	RM-BS18	08/25/94		0		94-2433		X	X	X	X	X			X					X		X	
		RM-BS21	08/25/94		0		94-2433		X	Х		X	X			Х					X		X	- 1
		RM-BWP3-82594	08/25/94		0		94-2433		X	X		X	Х			Х					X		X	
		RM-DRILLRIG	07/09/94		0		94-1899					_ X	X	Χ					Х					
GW	DRILLRIG	RM-DRILLRIG	07/09/94		0	0	94-1899	F									X						X	
		Offsite Wells															·							
GW	FF-01	RM-FF1-9694	09/06/94	-	0	0	94-2541	F				Х	Х					X			X			
		RM-GS1-9694	09/06/94		0		94-2541					X	Х					X	***************************************		X			
GW		RM-SM1-9694	09/06/94		0	0	94-2541	F				X	Х					X			X			
		Monitoring Well Grou	undwater	Samples		***																		-
GW		RM-MW-01-EB	07/12/94		0	0	94-1926	F				Х	Х	Х			Х		Х				Х	
		RM-MW01-7-94	07/18/94		0		94-2000				X	X	Х	X		Х		X				X		
		RM-MW01-81594	08/15/94		0		94-2305				X	X	Х						~~					
		RM-MW02-7-94	07/18/94		0		94-2000	_				Х	Х	Х		X		X					X	
		RM-MW02-81594	08/15/94		0		94-2305					X	Х			X								
		RM-MW22-7-94	07/18/94		0		94-2000					X	X	Х		X		X					X	
		RM-MW32-81594	08/15/94		0		94-2305					X	X	X		X		X		Х			X	
		RM-MW32-81594	08/15/94		0		94-2323											.						X
		RM-MW03-7-94	07/18/94		0		94-2000				Х	X	Х	Х		X		X				Х	Х	
		RM-MW-33-7-94	07/18/94		0		94-2000					X	X	X		Х		X				X	X	
		RM-MW-04-81594	08/15/94		0		94-2305				Х	Х	Х	Х	X								-	
		RM-MW-04-7/18	07/18/94				94-2000				X	X	Х	X	X	X		Х				X		
		RM-MW05-7-94	07/18/94		0		94-2000					X	Х	Х		Х		X					Х	***************************************
		BPA-MW5-81694	08/16/94		0		94-2323					X	X	X		X		X		X	X			X
		RM-MW-06-7/18	07/18/94				94-2000					X	X	X		X	X	X					Х	
		RM-MW-07-EB	07/09/94		Ö		94-1899					X	X	X			X		Х				X	
		RM-MW-07-7/18	07/18/94		- →		94-2000					$\hat{\mathbf{x}}$	X	$\frac{\hat{\mathbf{x}}}{\mathbf{x}}$		X	$\hat{\mathbf{x}}$	X					$\frac{\hat{x}}{x}$	
		RM-MW08-81594	08/15/94		0		94-2305					X	X						-					$\neg \dashv$
		RM-MW-08-7/18	07/18/94		- ∸		94-2000					$\frac{\hat{x}}{x}$	$\frac{\hat{\mathbf{x}}}{\mathbf{x}}$	Х		X	X	X					X	
		RM-MW09-81594	08/15/94		0		94-2305				Х	X	$\frac{\hat{x}}{x}$	$\hat{\mathbf{x}}$		$\frac{\hat{x}}{x}$	<u>-^`</u>	X		X	X		$\frac{\hat{\mathbf{x}}}{\hat{\mathbf{x}}}$	
<u> </u>		1 1141-1414 404-0 1024	00/10/94			U		of 3				_^_				^		_^_						

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Groundwater Tracking Data

						<u> </u>	Junuwate	_	VIVII 2	,	<u> </u>													
Matrix	Station ID	Sample ID		Add. Anal. Date	Beg depth	End depth	Lab #	Lab Results In (a)	Aluminum	Arsenic	Cyanide-Amen.	Cyanide-Total	Fluoride	Metals-23(CLP)	Metals-Dis.	РАН	TPAH-S	ьсв	PCB-S	Pesticide-Chlor.	SVOC	ТРН	TPH-S	voc
	MW-09	RM-MW09-81594	08/15/94		0		94-2323																	Х
	MW-09D	RM-MW29-81594	08/15/94		0		94-2305				X	Х	Х	X		Χ		X		X	X		Χ	
	MW-09D	RM-MW29-81594	08/15/94		0		94-2323																	Х
	MW-10	RM-MW-10-81594	08/15/94		0		94-2305					X	Х	X	Χ	Х		X		X	Х		Х	
	MW-10	RM-MW-10-81594	08/15/94		0		94-2323																	X
		RM-MW10-2.5EB	08/05/94		2.5		94-2202	I				Χ	Х	Χ			Х		X				Χ	
	MW-11	RM-MW11-81594	08/15/94		0		94-2305				Х	Χ	Х	Х	Х	Х		Х		Х	Х		Х	
	MW-11	RM-MW11-81594	08/15/94		. 0		94-2323												-					X
		RM-MW11-2.5EB	08/04/94		2.5	2.5	94-2202	F				Χ	X	X			Χ		Х				Χ	
	MW-12	RM-MW12-81594	08/15/94		0		94-2305					Χ	X	X		Х		X		X	Х		Х	
GW	MW-12	RM-MW12-81594	08/15/94		0	0	94-2323	F																Х
	•	Production Wells																						
GW	PW-03	RM-PW03-81694	08/16/94		0	0	94-2323	F				X	Х	X		Х		X		X	Х		Х	X
GW	PW-07	RM-PW07-81694	08/16/94		0	0	94-2323	F				Х	X	X		X		X		X	Х		Х	Х
GW	PW-08	RM-PW08-81594	08/16/94		0	0	94-2323	F				Х	Х	Х		Х		Х		Х	Х		Х	Х
GW	PW-10	RM-PW10-81694	08/16/94		0	0	94-2323	F				Х	X	X		X		X		X	X	X	Х	X
GW	PW-18	RM-PW18-81694	08/16/94		0	0	94-2323	F			Х	Х	Х	Х		Х		Х		Х	Х		Х	Х
GW	PW-18	RM-PW18TB	08/16/94		0	0	94-2323	F				************									•			X
GW	PW-18D	RM-PW28-81694	08/16/94		0	0	94-2323	F			X	X	X	Х		Х		Х		X	X		X	X
		Soil Boring Samples	3																,,,,,,,				,	.**
SB	MW-01	RM-MW-01-S	07/12/94		0	0	94-1926	F				Х	Х	Х		Х	X	X	Х			Х	Х	
SB	MW-01	RM-MW-01-2.5	07/12/94		2.5		94-1926					X	X	Х			X		Х				X	
SB	MW-01	RM-MW-01-7.5	07/12/94		7.5	7.5	94-1926	F				X	Х			Х	X	X	X			X	Х	
SB	MW-01	RM-MW01-10	07/12/94	Ì	10	10	94-1926	F					~				X							
SB	MW-01	RM-MW01-12.5	07/12/94		12.5		94-1926						•				Х							
	MW-01D	RM-MW-01-SD	07/12/94		0		94-1926					Χ	Х	Χ			X		Х				Χ	
		RM-MW-02-S	07/11/94		0		94-1913					X.	Х	Χ			Χ		Х				Χ	
	MW-02	RM-MW-02-2.5	07/11/94		2.5		94-1913					Х	Х	Χ			Х		Х				Χ	
SB		RM-MW-02-7.5	07/11/94	<i>'</i>	7.5		94-1913					X	X				Х		Х				Х	
SB		RM-MW-02-12.5	07/11/94		12.5	12.5	94-1913	F				Х	Х				Χ		X				Х	
		RM-MW-03-S	07/09/94		0		94-1899					Х	Х				Х		X				Χ	
SB	MW-03	RM-MW-03-2.5'	07/09/94		2.5	2.5	94-1899	F				Χ	Х				·X		X				Х	
SB	MW-04	RM-MW-04-S	07/12/94		0	0	94-1926	F				Х	Х	Х		Х	Х	X	Х			Х	Χ	
								2 04 2																

Groundwater Tracking Data

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Matrix		 	Collection Date	Add. Anal. Date	Beg depth	End depth	Lab #	Lab Results in (a)	Aluminum	Arsenic	Cyanide-Amen.	Cyanide-Total	Fluoride	Metals-23(CLP)	Metals-Dis.	РАН	TPAH-S	РСВ	PCB-S	Pesticide-Chlor.	svoc	ТРН	TPH-S	voc
SB	MW-04	RM-MW-04-2.5	07/12/94		2.5		94-1926					X	Х	X	.		X		X				X	
	MW-04	RM-MW-04-7.5	07/12/94		7.5		94-1926					X	Х				X		Х				X	
SB	MW-04	RM-MW-04-10.0	07/12/94		10	10	94-1926	F				X	Х				X		Χ				X	
SB	MW-05	RM-MW-05-2.5	07/08/94		2.5	2.5	94-1895	F				X	Х				X		Х				Х	
SB	MW-06	RM-MW-06-S	07/08/94		0		94-1895					Х	X	Х			X		Х				Х	\neg
SB	MW-06	RM-MW-06-2.5	07/08/94		2.5	2.5	94-1895	F				X	X	X			X		X				X	
SB	MW-06	RM-MW-06-7.5	07/08/94		7.5	7.5	94-1895	F				X	X				X		Х				X	
SB	MW-07	RM-MW-07-S	07/09/94		Ō	0	94-1899	F				Х	Х				X		Х				X	
SB	MW-07	RM-MW-07-2.5'	07/09/94		2.5	2.5	94-1899	F				Х	X	X			X		X				X	
SB	MW-07	RM-MW-07-7.5'	07/09/94		7.5	7.5	94-1899	F		<u> </u>		X	X				X	l. I	Х				X	
	MW-07	RM-MW-07-10.0'	07/09/94		10		94-1899			*****		X	X				. X		Х				X	
SB	MW-07D	RM-MW-07-2.5D	07/09/94		2.5		94-1899					X	X	Х			X		X				X	
SB	MW-08	RM-MW-08-S	07/07/94		0		94-1882					Х	Х				Х		Х				X	
SB	MW-08	RM-MW-08-2.5	07/07/94		2.5		94-1882					X	X				X		Х	·			X	
SB	MW-09	RM-MW09-S	08/04/94		0		94-2179					Х	X	Х		Х	X	Х	Х				Х	
		RM-MW09-2.5	08/04/94		2.5		94-2179									X	X							
		RM-MW09-17.5	08/04/94		17.5		94-2179					X	X	X			X		χ.				Х	
		RM-MW10-S	08/05/94		0		94-2202					X	X	Х		Х	Х		Х				Х	
		RM-MW10-2.5	08/05/94		2.5		94-2202					-				X								
	MW-10	RM-MW10-7.5	08/05/94		7.5		94-2202					X	X				X		X				Х	
	MW-10	RM-MW10-10	08/05/94		10		94-2202					X	Х			***************************************	X		Χ				X	
SB	MW-11a	RM-MW11-S	08/04/94		0		94-2202					Х	X	Х		X	Х	X	X			Х	X	
		RM-MW11-2.5	08/04/94	8/31/94	2.5		94-2202		\vdash							X								
		RM-MW11-5.0	08/04/94		5		94-2202					Х	Х	Х			X		Χ				X	
	f	RM-MW11-7.5	08/04/94		7.5		94-2202					X	X	X			X		Х				X	
	MW-12a	RM-MW12-S	08/04/94		0		94-2179					X	Х	Х		Х	X	Х	Х				X	
	MW-12b	RM-MW12-7.5	08/04/94		7.5		94-2179		<u> </u>			X	X	X			X		X				X	
		Notes:																						
		(a) F = Final results																						
	-	P = Preliminary re	esults																					
-		INC = Incomplete		liminary r	esults	. outst	anding da	ita.																
						,																		
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North Landfill East Area

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REV 7/86 FORM D1599		•	•	•	•		•	•		•	·		•	•	•	•	COMMENTS		1	6/20	MAP OF WALL OF PIT	TL LOG	SHEET 3 OF 10	



PROJECT NUMBER

OPE 39285.40 TEST PIT NUMBER SHEET 4 of 10

TEST PIT WALL LOG

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PROJECT NUMBER TEST PIT NUMBER

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and the second s									1	AS (E-4-N3)	. ` .						-	DEPTH	EXCAVATION METHOD CAT 4/68	THU	LOCATION EAST &		OPE 38285. AR
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PROJECT NUMBER	TEST PIT NUMBER			<u> </u>
OPE 39285, A.B	SHEET (8_	OF /	0

ŧr	SAM	IPLE	PROJECT <u>PMC UNKAR</u>	N WASTE PO	<i>Έ</i> ι			MAP OFWALL OF
SURFACE (FT)	₹.	Š E	ELEVATION					DATE EXCAVATED 6/20/84
RFAC	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE				*	
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PROJECT NUMBER	TEST PIT NUMBER			
OPE 39285.AG		 SHEET	9	OF 10

*~	SAM	PLE	PROJECT PMC UNINO	W WASTE ALE	LOCATION EAST HE	ADING WEST	MAP OFWALL OF PIT
DEPTH BELOW SURFACE (FT)	AL	94	ELEVATION	CONTRACTOR	<u> FMW</u>	DATE 6	EXCAVATED 6/20/94
PTH	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE	EXCAVATION			R KNO
<u>88</u>	<u> </u>	Èź	APPROXIMATE DIMENSIONS:	LENGTH WIDTH	DEPTH	HEMARKS	OOMMENTO
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»	SAMPLE	_	PROJECT EMIC WILLIAM WASTE PUE LOCATION EAST-HEADING WEST	MAP OFWALL OF PI
ELO\			CONTRACTOR TAKE	6/20
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LENGTH (FT)			· (S-H-MI)		BLACK CARBON REI	SOIL CONER Brown SILT	LOCATION CONTRACTOR TMW EXCAVATION METHOD C LENGTH WIDTH DEP	
-			•		REFRACTORY		52017H HE	PROJECT NUMBER OPE 39285. AØ T
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ENGTH (FT)					•		•		. And the special section of the sec				BUNK CARBON BEFERT			' SOIL COVER	TION	WIDTH RE	EXCAVATION METHOD CAT 41613		LOCATION SOUTH HEAD		OF 39285 Ap	PROJECT NUMBER
4	The second secon		•		•		•		*		•		•					REMARKS		D	HEADWIG MOETH	TEST PIT WALL LOG		TEST PIT NUMBER
0			1	-		+	-			-:1							COMMENTS		LOGGER ZWO	6/2	MAP OFWALL OF PIT	ALL LOG	SHEET 2 OF 7	A



PROJECT NUMBER	TEST PIT NUMBER
OPF 39285 AD	SHEET 3 OF 7

≱c	SAN	IPLE	PROJECT RAN UVKNOWN WASTE DILE	LOCATION SOUTH HEADING NORTH	
BELO CE (F	/AL	O G	ELEVATION CONTRACTOR WATER LEVEL AND DATE EXCAVATION ME	THW D	ATE EXCAVATED 6/20/9/
DEPTH BELOW SURFACE (FT)	NTERVAL	TYPE AND NUMBER	APPROXIMATE DIMENSIONS: LENGTH WIDTH	DEPTH REMARKS	OGGER <u>Puv</u>
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<u> </u>		4	LENGIA (FT)		†



PROJECT NUMBER	TEST PIT NUMBER			
OPE 39785. AG	`	SHEET	4	of Z

₹E	SAN	MPLE I	PROJECT RMC UNKNOWN			HEADING NORTH	
DEPTH BELOW SURFACE (FT)	NTERVAL	TYPE AND NUMBER	ELEVATION WATER LEVEL AND DATE	CONTRACTOREXCAVATION M	<i>IMW</i> ETHOD <u>CAT 4/6/8</u>	DAT	E EXCAVATED 6/20/94
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PROJECT NUMBER	TEST PIT NUMBER
OPE 39285.Ad	SHEET 5 OF 7

≩c	SAN	MPLE	PROJECT RMC UNKNOWN WASTE PILE	L(OCATION SOUTH		
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	ELEVATION CO	ONTRACTOR _Z KCAVATION MET	ACTOR <u>TMW</u> DATE EXCAVATED <u>6/6</u> ATION METHOD <u>CAT 4/6/8</u> LOGGER <u>ENO</u>		
SCR	N E	Z S	APPROXIMATE DIMENSIONS: LENGTH V	NIDTH	DEPTH	REMARKS	
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4 - 5 -			BLACK CARBON RESEACTORY WI BRICKS	•	•		
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8- 9-				•	•		
/0 - // -			WASTE PINE DEPTH EXCEPTED THE REACH OF THE CAT 416 B		NOT EXCAUA ASSUME S (S-H-N3)	SAME AS	DEEL SHELL NOTED
12-			(5-H-N3)			-	e BUTTOM OF EXCAMPATION
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		8	LENG	TH (FT)		100	



PROJECT NUMBER OPE 39285.AD TEST PIT NUMBER SHEET 6 of 7

TEST PIT WALL LOG

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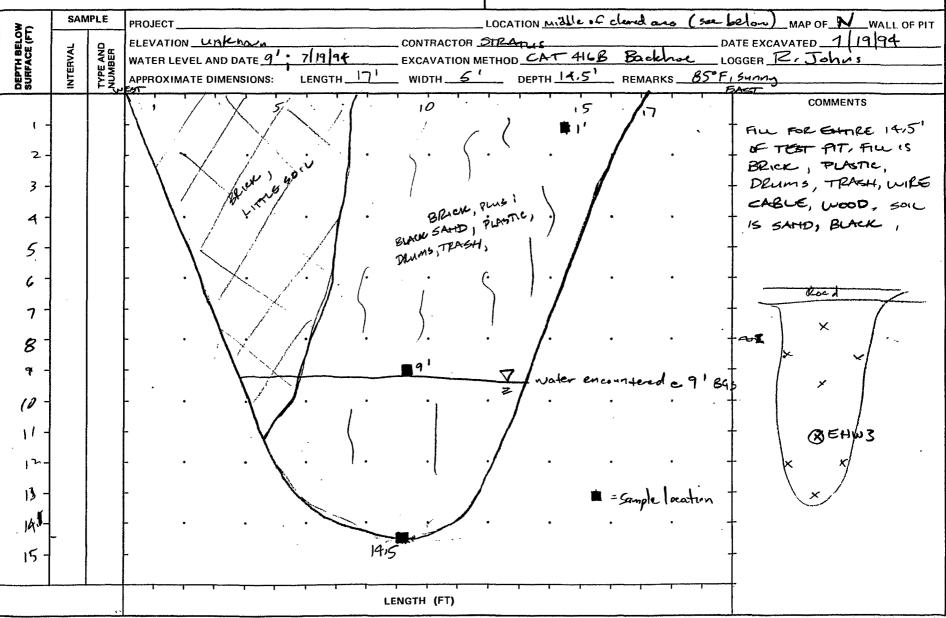
PROJECT NUMBER	TEST PIT NUMBER
OPE 39285.AD	SHEET 7 OF 7

≱c	SAN	IPLE	PROJECT RMC UNKNOWN	LUASTE ALE	Lo	CATION SOUTH	HEADWH NORTH	MAP OFWALL OF PIT
DEPTH BELOW SURFACE (FT)	\	Σ gg		ELEVATION WATER LEVEL AND DATE			•	DATE EXCAVATED 6/20/94
	INTERVAL	TYPE AND NUMBER	APPROXIMATE DIMENSIONS:	LENGTH		HOD <u>C#/ 9/6/25</u> DEPTH		LOGGER BUD
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North Landfill West Area



PROJECT NUMBER	TEST PIT NUMBER		***************************************	*******	******
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СНМНІЦ				·	PROJECT NUMBER	TEST PIT NUMBER	SHEET / OF /		
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₹F	SAM	PLE	PROJECT <u>ZMC</u>			LOCATION NOTH LANDFILL AREA MAP OF WALL OF			
CE (I	¥	S E	ELEVATION	CONTRAC	TOR <u>STRATUS</u> ION METHOD <u>CAT 426</u>	DATE EXCA	VATED 7/19/94		
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE APPROXIMATE DIMENSIONS:	LENGTH 10 WIDTH	6 DEPTH 7	REMARKS SUNL SCE			
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	PROJECT NUMBER	TEST PIT NUMBER			······································
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	SAM	IPLE	PROJECT LUC NEOTH	iest Carolfill area		* * * * * * * * * * * * * * * * * * * *
DEPTH BELOW SURFACE (FT)			ELEVATION	CONTRACTOR	LOCATIONSTRATILS	MAP OF WALL OF PIT DATE EXCAVATED 7/20/9.V
¥ ¥ S	INTERVAL	I AN	WATER LEVEL AND DATE	EXCAVATION M	ETHOD Cat 416b	LOGGER KUE
SCE	IN	TYPE AND NUMBER	APPROXIMATE DIMENSIONS:	LENGTH /5 WIDTH 3	DEPTH REMARKS	
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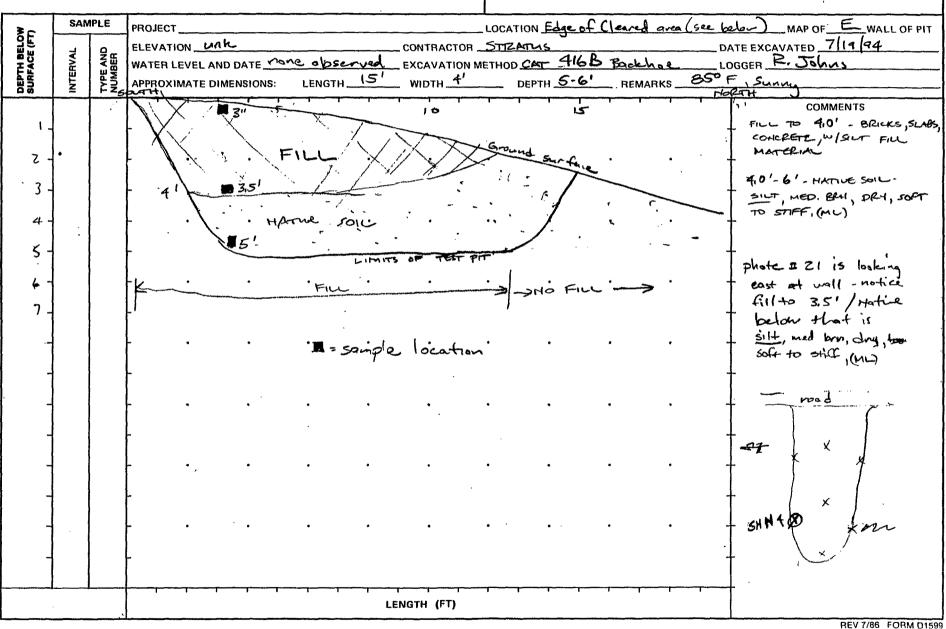
REV 7/86 FORM D1599

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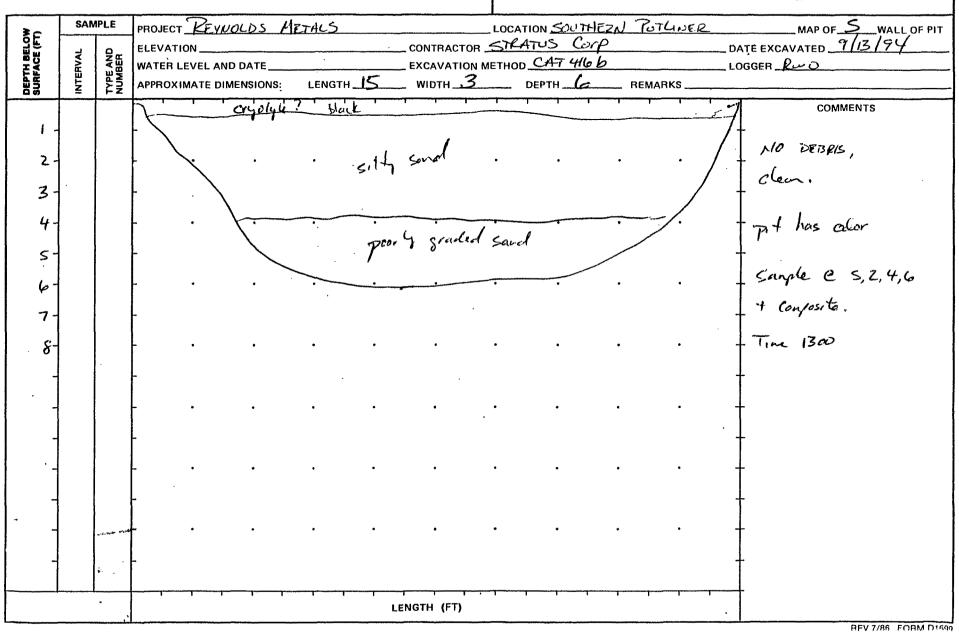
South Landfill Area

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PROJECT NUMBER

OF 37293, P.O.O.3

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Note: The south landfill was previously termed the "south potliner area." This terminology was revised for this Removal Site Assessment (RSA) report because information available to date (including the results of the RSA) indicate that this fill does not include potliner.



PROJECT NUMBER

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East Potliner Area



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DEPTH BELOW SURFACE (FT)	ـ إ	2	ELEVATION		_CONTRACTOR _SZ	RATUS		DATE EXCAVATED 7/22/94
₽¥	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE		_ EXCAVATION METH	OD <u>CATYIBE</u>	<u> </u>	LOGGER LUO
25 E	E	£ \$	APPROXIMATE DIMENSIONS:	LENGTH	WIDTH	DEPTH	REMARKS	
								COMMENTS
1.					a 1			- Roots & Organic
2.				· veci	ly graded	S. 43	. //	matter
3.				,				Roots & Organic months Samples collected Esurface, 7, 84'
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DELO	VAL.	O E	WATER LEVEL AND DATE CONTRACTOR STRATUS DATE EXCAVATED ZIZZ 154 WATER LEVEL AND DATE EXCAVATION METHOD CAT 4166 LOGGER LUX
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	APPROXIMATE DIMENSIONS: LENGTH ZZ WIDTH 3 DEPTH 12 REMARKS
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and the second s	-	-1	-			1		<u> </u>		·			•	- Sounce	· · · · · · · · · · · · · · · · · · ·	Ser. 6 2,	DATE EXC	N	TEST PIT WALL LOG
RFV 7/86 FORM D1500														Soyale @ Surtice: C		COMMENTS	RVATED 7182177	MAP OF WALL OF PIT	SHEET 1 OF 1



DEPTH BELOW SURFACE (FT) S INTERVAL SAMPLE TYPE AND NUMBER WATER LEVEL AND DATE. ELEVATION_ APPROXIMATE DIMENSIONS: PROJECT LIME EASTERN Dry party Standed sand LENGTH BILLIER LENGTH (FT) - CONTRACTOR STEATUS EXCAVATION METHOD CAT 4166 WIDTH Brow 5/1 norst ~ LOCATION 0/25273.B.O. O.3 PROJECT NUMBER 1 sme DEPTH. REMARKS **TEST PIT WALL LOG** TEST PIT NUMBER LOGGER LUC soils becoming noist 0 W/ MAP OF E COMMENTS 129 WALL OF PIT OF /

REV 7/86 FORM DISON



PROJECT NUMBER

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₽₹	INTERVAL	E AN	WATER LEVEL AND DATE		EXCAVATION M	етнор <i>САЧ 416</i> 5	L(OGGER RUO
DEPTH BELOW SURFACE (FT)	ITN	TYPE AND NUMBER	APPROXIMATE DIMENSIONS:	LENGTH	width <u>3</u>	DEPTH	REMARKS	
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DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE APPROXIMATE DIMENSIONS:	LENGTH	width 3	DEPTH 4	REMARKS		
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				LEN	IGTH (FT)				
	·/···								REV 7/86 FORM D1599

DEPTH BELOW SURFACE (FT) INTERVAL SAMPLE TYPE AND NUMBER PROJECT TMC ELEVATION_ APPROXIMATE DIMENSIONS: WATER LEVEL AND DATE. LENGTH_ inverse perty Stands sand LENGTH (FT) _ CONTRACTOR STRATUS EXCAVATION METHOD CAT WIDTH_ LOCATION PROJECT NUMBER of 135253. Bd. 013 DEPTH_ REMARKS **TEST PIT WALL LOG** TEST PIT NUMBER LOGGER LOG Sry cryclite 7 MAP OF E SHEET COMMENTS REV 7/86 FORM D1599 WALL OF PIT

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						•								INTER	IVAL	SAMPLE			
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LENGTH (FT)			• ·					•			HA	•	8 inched suc	WIDTH 3	EXCAVATION METHOD CAP	. !	and the second s	2	-
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REV 7/86 FORM D1599

Scrap Yard



PROJECT NUMBER	TEST PIT NUMBER			
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3.0	SAN	PLE	PROJECT RMC SCRAF YARD LOCATION MAP OF WALL OF PIT	
DEPTH BELOW SURFACE (FT)	Ĭ.	₽~	ELEVATION CONTRACTOR STRATUS DATE EXCAVATED	_
₹Š	INTERVAL	E AN	WATER LEVEL AND DATE EXCAVATION METHOD CAT 465 LOGGER & SFO	_
SCR	TNI	TYPE AND NUMBER	APPROXIMATE DIMENSIONS: LENGTH 11 WIDTH 2.5 DEPTH 415 REMARKS LOOKING & SOUTH WALL	_
			GEV Med /Fine Silt - bricks included SAMPLE & Sales	7
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2			Brown SAND poorly graded	
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PROJECT NUMBER

TEST PIT NUMBER

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€E	SAN	IPLE	PROJECT PINC SCRAP YARD LOCATION_			MAP OF WALL OF PIT
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE	EXCAVATION METHOD CHT 4	DATE EX LOGGER LOGGER REMARKS LOOKING A	CAVATED 7 25/9 Y
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			LEN	IGTH (FT)		REV 7/86 FORM D159



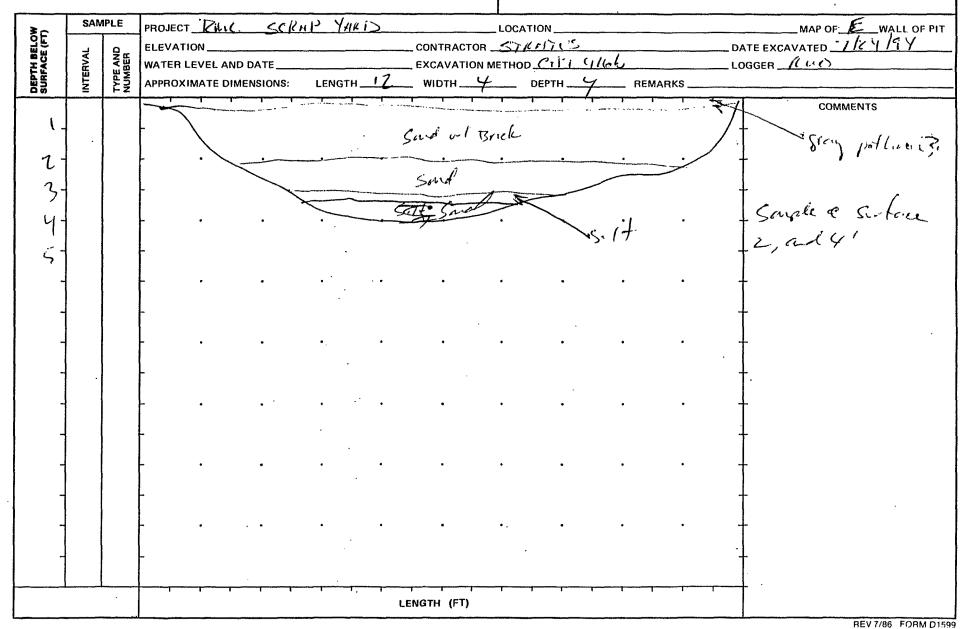
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	SAN	IPLE	PROJECT RUC SORAP YARD	LOCATION	MAP OFWALL OF		
DEPTH BELOW SURFACE (FT)	\ F	۵۳	ELEVATION CONTRA	CTOR STRATUS	DATE EXCAVATED _7 /25 /94		
AFAC	NTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE EXCAVA APPROXIMATE DIMENSIONS: LENGTH 12 WIDTH	TION METHOD <u>C井子 仰らり</u>	LOGGER SFO REMARKS VIEW of North WALL		
9 5 8 8	Ξ	ξŠ			REMARKS VIED OF NOTE WALL		
			brick fill at grey med/ his	alt I	COMMENTS		
			grey Med/Are Silt		SAMPLES GILECTED		
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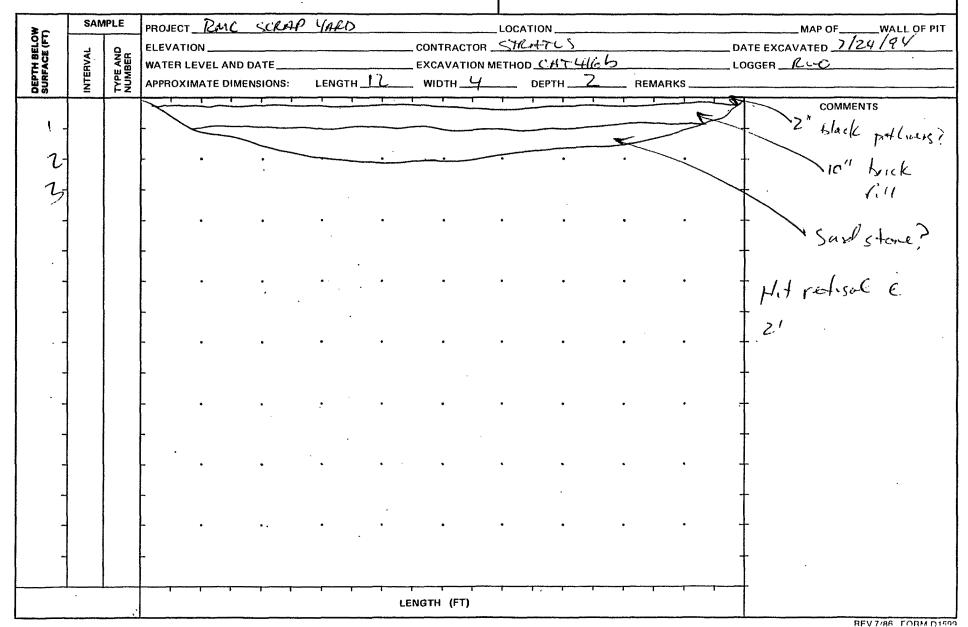
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§c	SAN	PLE	PROJECT KNIC SCKA	PYIKO	L(OCATION		MAP OF WALL OF PIT
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₹¥.	INTERVAL	E AN	WATER LEVEL AND DATE	•	EXCAVATION MET	HOD CITI 4166	<u> </u>	LOGGER RUO
DEPTH BELOW SURFACE (FT)	¥	TYPE AND NUMBER	APPROXIMATE DIMENSIONS:	LENGTH 17	WIDTH	DEPTH	REMARKS	
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DEPTH BELOW SURFACE (FT)		INTERVAL	TYPE AND NUMBER	ELEVATION WATER LEVEL AND C			CONTRACTO	N METHOD	CHT 416	,b	LOGG	EXCAVATED 7/24/94
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PROJECT NUMBER	TEST PIT NUMBER		***************************************	
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REV 7/86 FORM D1599

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DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	ELEVATION		LOCA CONTRACTOR STE EXCAVATION METHOD WIDTH 3	1715 CHT 4161=	D/P LC	MAP OF K WALL OF PIT ATE EXCAVATED 7/24/84
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PROJECT NUMBER

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INTERVAL	TYPE AND NUMBER			EXCAVATION METHO	CATHIGH	L	ATE EXCAVATED 2/24/94 OGGER_ROO
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			LEN	IGTH (FT)	 		
		INTERVAL SS SS SS SS SS SS SS SS SS SS SS SS SS		THE PART OF THE PA		ELEVATION CONTRACTOR STATTUS WATER LEVEL AND DATE EXCAVATION METHOD CATCULOR APPROXIMATE DIMENSIONS: LENGTH 17 WIDTH 3 DEPTH 4 CONTRACTOR STATTUS EXCAVATION METHOD CATCULOR EXCAVATION METHOD CATC	ELEVATION WATER LEVEL AND DATE APPROXIMATE DIMENSIONS: LENGTH 17 WIDTH 3 DEPTH 4 REMARKS C.114, S.A. C.114, S.A. C.114, S.A. C.114



		- 422	DEPTH BELOW SURFACE (FT)	XMHILL
		·	INTERVAL SAME	,
			NUMBER	
			PROJECT KALL	
	•	. / . .	D DATE	
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		Se. 28	CONTRACTC EXCAVATIO WIDTH	
• • •			LOCATII SYLCH	PROJECT NUMBER 公化39233
	•		9312	UMBER ウ3. <i>Ba.女と</i>
	· •		REMARKS	
	·		Loc	NUMBER
	Signal of the state of the stat	Chalife ?	MAP OF M WALL OF PIT	TEST PIT WALL LOG
				SAWPLE PROJECT KILL SLOAT STACKTON LOCATION MAP OF

REV 7/86 FORM D1500



PROJECT NUMBER

CVE 39273.KDVV SY SHEET OF

3.	SAMPLE		PROJECT YUIC CONF YARL LOCATION MAP OF 5 WALL OF PIT
DEPTH BELOW SURFACE (FT)	VAL	AND EB	WATER LEVEL AND DATE EXCAVATED CONTRACTOR STEATUS DATE EXCAVATED 7/26/54 WATER LEVEL AND DATE LOGGER RUND LOGGER RUND
DEPTH	INTERVAL	TYPE AND NUMBER	APPROXIMATE DIMENSIONS: LENGTH 17 width 9 depth 9 remarks
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PROJECT NUMBER	TEST PIT NUMBER	<i>,</i> _ ,		
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REV 7/86 FORM D1599

ξE	SAN	IPLE	PROJECT KILL SCRIP LAKES LOCATION MAP OF WALL OF PIT
BELO YE (F	<u>ل</u> ـ	5 "	ELEVATION CONTRACTOR SENTING DATE EXCAVATED 1/4/191/
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	WATER LEVEL AND DATE EXCAVATION METHOD CAT CITCLE LOGGER KCCO
8 C C	INI	₽Ş	APPROXIMATE DIMENSIONS: LENGTH 12 WIDTH 2.5 DEPTH 5 REMARKS LOCKING NORTH
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	<u> </u>	DEPTH BELOW BURFACE (FT)	СКЯНЩ
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LENGTH (FT)	brown sand poorly gradud	TEST PROJECT LUC SCLAP VALLE ELEVATION LOCATION LOCATION ELEVATION STLATUS WATER LEVEL AND DATE EXCAVATION METHOD CAT ULE APPROXIMATE DIMENSIONS: LENGTH 12 WIDTH 2.5 DEPTH 4.5 REMARKS	PROJECT NUMBER T
REV 7/86 FORM D1599	SAMPLES TAKEN & SURFACE, Z.O', 4.5' & COMMENTS	DATE EXCAVATED 7/25/7 Y LOGGER LOGGER STO	TEST PIT NUMBER



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.e.	SAM	IPLE	PROJECT RUC SCLAP YARD LOCATION MAP OF WALL OF PIT
DEL(VAL	E AN	CONTRACTOR STELLTUS DATE EXCAVATED 7/24/94 WATER LEVEL AND DATE EXCAVATION METHOD CAT 46 b LOGGER RU
DEPTH BELOW SURFACE (FT)	INTERVAL		WATER LEVEL AND DATE EXCAVATION METHOD CAT 466 LOGGER_RU APPROXIMATE DIMENSIONS: LENGTH_12 WIDTH_2.5' DEPTH_41 REMARKS_500TH SIDE VIEW OF WRU
			Well Poor 15° Grace / Gill (bricks) Gry Mad/ Fine Silt SAMPLES @ Surface,
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y			3 brown Sind
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	SAMPLE		PROJECT KWA SCRI	r VARIS	LOCA	TION		MAP OFWALL OF PIT
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	ELEVATION WATER LEVEL AND DATE APPROXIMATE DIMENSIONS:	LENGTH 12	CONTRACTOR	CAT 4166	DATLOG	E EXCAVATED 7 1256 44
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		`		I.	ENGTH (FT)			REV 7/86 FORM D1599

Miscellaneous Areas

DEPTH BELOW SURFACE (FT) \mathcal{W} \overline{V} N INTERVAL SAMPLE TYPE AND NUMBER WATER LEVEL AND DATE ELEVATION_ PROJECT KML-**APPROXIMATE DIMENSIONS:** LOUTDAK AND SHOOT LENGTH_ LENGTH (FT) EXCAVATION METHOD, CONTRACTOR _ WIDTH_ ML room 2 LOCATION WEST PROJECT NUMBER OPE39293.155.04 JS. FIGID REMARKS. ML TEST PIT WALL LOG TEST PIT NUMBER 12X-NOTIVE: NO POBILS ANTED BHLOGGER. LOGGER P. Brown 5 Sit exclay (ml) d-FINE, BY, Sof _MAP OF comments REV 7/86 FORM D1599 10/ WALL OF PIT 유



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																		TYPE NUM	AND BER	<u> </u>	SAMPLE			
1									•				•	5/4 Sand	4.3	c.H. w	Prove Offerent matter	NS: LENGTH 13,0	WATER LEVEL AND DATE		BEN IECT RANC - T			•
															•	1 0/to 6" NA		рертн_3	METHOD CAST BY HY	STATOS	MAIN MAIN	TEST F		DOC IECT NIMBED
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REV 7/86 FORM D1599



PROJECT NUMBER

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E (F)	بر	۵	ELEVATION CONTRACTOR DATE EXCAVATED 9/23/94
FAC	INTERVAL	E AN	WATER LEVEL AND DATE EXCAVATION METHOD IS LOGGER
DEPTH BELOW SURFACE (FT)	IN	TYPE AND NUMBER	APPROXIMATE DIMENSIONS: LENGTH 12 WIDTH 4 DEPTH 3 REMARKS
			Roots / Organic matter COMMENTS
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Appendix C Geo Recon Electrical Resistivity Survey Report



applied geophysics

1 INTERNATIONAL

December 15, 1994 J94-611

Dave Dailer CH2M-Hill, Inc. 825 N.E. Multnomah, Suite 1300 Portland, Oregon 97232

Gentlemen:

This letter report presents the results of geophysical studies completed to assist with geo-hydrologic and environmental studies at the Reynolds Aluminum Plant near Troutdale, Oregon. The general location of the exploration sites are shown on Figure I, Vicinity Map.

Magnetic, Electromagnetic and Electrical resistivity methods are viable geophysical techniques to assist in the definition of the subsurface geologic conditions at the Reynolds site. The electromagnetic and electrical resistivity methods were used in the South landfill area. The electromagnetic and electrical resistivity data appears to indicate the spatial location of the suspected waste area. It is important to note that the VES data solution, although plotted as a point solution, is derived over a moderately large area, and as such represents a composite average of the geophysical properties of the material layering at that point; whereas a drill hole log describes a discrete sample at a discrete depth.

Test pits were subsequently excavated by CH2M-Hill at several locations to establish correlation's between the VES data and discrete samples.

The computer methodology used to reduce the field collected electrical resistivity data to solution layering is more rigorous than curve matching or other empirical techniques. We normally use these more rigorous procedures to reduce the number of possible solutions for any single set of field data and provide a more definitive description of the geophysical regime at exploration sites.

The exploration program was coordinated with Mr. Dave Dailer of CH2M-Hill, The field data were collected between August 16 and August 30, 1994. Coordinate locations were established by reference to grid lines previously established by CH2M-Hill surveyors. Vertical control was obtained from the topography, as shown on a provided map.

MAGNETIC METHOD

The purpose of the magnetometer survey was to locate potential areas where electrical capacitor cores may have been buried. The areas, which were investigated, had been previously identified by Reynolds Metals and CH2M-Hill reconnaissance activity. The sites were surveyed on lines arbitrarily established across each area after discussion with CH2M-Hill personnel.

A EDA OMNI IV Magnetic Gradiometer was used to make the magnetic readings over five selected areas. This instrument records the Total Field of the top sensor, time and date of each reading and the X-Y grid location of the reading. The Total Field reading of the top sensor has been reduced to an arbitrary base station reading of 57,000 nano-Tesla (nT) utilizing Tie-Line methods to correct for diurnal variations occurring during the measurement period. A separate base station was established for each of the 5 areas. The average magnetic field for the area was in the order of 57,000 nT. The instrument is controlled by micro-processors, and the programming includes a circuit check of the processing system when the instrument is turned on. A brief discussion of magnetic theory follows in the text below.

RESULTS

The data from the five sites are presented as magnetic profiles at each site. Site 1, the north landfill area consists of line 1 and line 2, Figures 3 and 4. Line 1 was completed East to West with station 100 equal to a survey hub placed by CH2M-Hill surveyors. The ending station of line 2 is at station 100 of line 1. The most significant feature of these two lines is the magnetic high occurring near station 75 of line 1. This may also be associated with the high shown near the end of line 2.

Line 3, Figure 5, was completed along an open area approximately 500 feet South of line 1, near the northeast corner of the company Lake. The line began at the outfall road to the island heading in a general westerly direction. No apparent anomalies are noted on this line, but proximity of power lines may have overridden any magnetic anomaly.

Line 4 and line 5, Figures 6 and 7, were completed along the top of the dike. High magnetic values observed along these lines are very likely the product of significant deposits of baked brick. Near the end of each line apparent major changes in the magnetic field are the product of power line interference.

Line 6 and line 7, Figures 8 and 9, were completed approximately 100 feet East of the power substation with approximately 50 feet separation between the lines. The lines were completed from the plant road to the dike (South to North). Again significant interference from overhead power lines was noted.

Lines 8 through 11, Figures 10, 11,12 and 13, were completed just northeast of the Reynolds facility, near the intersection of Sundial Road and the Plant Road. Line 8, Figure 10, was positioned approximately 50 west of the plant fence. All lines were North to South and spaced approximately 100 apart. The

data from lines 8 and 9 were relatively smooth and uneventful. Lines 10 and 11, Figures 12 and 13, show a significant negative to positive dipole effect approximately mid-line. It is suggested that further direct exploration be completed near the center of line 11.

MAGNETIC THEORY

The magnetic field over the surface of the earth is affected by local concentrations of (or absence of) magnetic materials, resulting in "anomalies" in the measured magnetic field. The concentrations or magnetic sources are described as either "dipoles" or "monopoles" depending on the configuration of the magnetic source. A "dipole" is essentially a magnetic source that exhibits both north and south poles, whereas a "monopole" exhibits a single pole, with the opposing pole at a great distance or infinity. An example of a "monopole" is that anomaly created by a deep well casing, whereas a "dipole" is that anomaly created by a piece of iron lying on the surface. However, it is noted that a magnetic source may be considered either as "line of monopoles" or as "line of dipoles" depending on the configuration of the source and the direction of the earth's field. For almost all cultural magnetic features, including hearths, the magnetic response is that of a dipole (Linington, 1964).

A material may have two magnetic fields; (1) an induced magnetization and (2) a remnant magnetization. Induced magnetization results from the ambient magnetic field, or the magnetic field of the earth. Remnant magnetization is that magnetic component which has a fixed direction relative to the rock and is independent of the earth's magnetic field.

The magnetic susceptibility (a measure of the degree to which a substance exhibits magnetization by an external field) increases when soil containing ferromagnetic material is heated and then cooled. That is, the magnetic susceptibility of the soil increases due to an increase in remnant magnetism (i.e. magnetism remaining in the absence of a magnetic field) as the temperature increases and is (or falls) below the Curie point (the Curie point of most rocks is 550 C.). The Curie point is the temperature above which thermal agitation prevents spontaneous magnetic ordering.

The strength of a "dipole" anomaly is inversely proportional to the cube of the distance between the source and the point of measurement. The magnetic strength of a "monopole" is inversely proportional to the square of the distance between the source and the point of measurement. The function describing a source magnetic strength is a function of the magnetic moment of the source, the distance from the source to the point of measurement, and a trigonometric relationship to the angle of inclination of the magnetic field. To define the fall off from the "peak" of the anomaly, the simple dipole function can become a complex equation.

ELECTROMAGNETIC METHODS

The electromagnetic data was collected with a Geonics EM-31. The data was collected by recording both the inphase and out-of-phase (quadrature) components, which were converted into apparent conductivity in milli-Siemens

per metre (milli-mhos per metre) for the conductivity and to parts per thousand (ppt) for the inphase response. The depth penetration of the EM-31 is approximately 18 to 19 feet (in the vertical dipole mode) depending on the height the instrument is carried off the ground, and the conductivity of the material measured.

The EM data points were collected at 25 foot intervals along the grid lines.

The EM-31 is a frequency domain electromagnetic device. The device transmits a 9.8 kHz electromagnetic signal. The resulting electromagnetic signal is received at another coil, spaced 3.66 metres from the transmitting coil. As the electromagnetic wave encounters a conducting medium (the ground), it sets up an alternating flow of current, which in turn radiates a wave at an equivalent frequency. This secondary wave interacts with the primary wave (transmitted through the air), creating distortion of the transmitted wave at the receiving coil. The amount of distortion is a function of the ability of the current to flow in the second medium (the ground), or the ground conductivity. The current flow through the ground is a function of two variables, (1) the inphase portion and (2) the out-of-phase portion. The out-of-phase portion acts at ninety degrees to the inphase portion.

When the transmitted wave interacts with a conductive material the distortion is dominated by the out-of-phase portion of the re-radiated wave. As a result the "computed" ground conductivity goes to zero (the inphase and out-of-phase voltages reverse polarity). The decrease in conductivity is preceded and followed by an increase in apparent conductivity.

The electromagnetic data was used as a guide along with the electrical resistivity data to determine the landfill boundary shown on Figure 2, Electrical Resistivity Studies. The electrical resistivity data was used as a guide for further direct exploration. Based upon our understanding of the local geology of the Reynolds site, we believe the near surface materials should exhibit a relatively high electrical resistivity, except in the materials below the water table where a reduction of the overall resistivity should occur. We believe the landfill materials should conversely demonstrate a low resistivity. Based upon the above, we have constructed an interpreted outline of the area believed to contain landfill materials. Variations, of the resistivity, within this area may represent changes in the percentage of landfill materials Of particular note are the very low resistivity zones shown near grid points E-500, D-400, C-150 and A-250. These areas show an extremely low resistivity which may indicate very high percentages of landfill materials. A general interpreted depth of the waste fill, based upon the electrical resistivity data, is approximately 6 to 8 feet. However, the highly variable nature of the fill material do not produce a uniform resistivity by which to establish a definite boundary.

The density of electrical data along line D is much more sparse than along other lines. Much of the data along this line was not interpretable due to interfering noise. The noise may be produced by unknown subsurface features, such as pipes and large deposits of metallic debris which produce huge lateral changes along the sounding array.

THE ELECTRICAL RESISTIVITY METHOD

The electrical resistivity method may be utilized to determine the configuration of subsurface materials based upon differences in their electrical properties (i.e., electrical resistivity).

C. and M. Schlumberger during the early 1900's were the primary developers of electrical prospecting methods, as we know them today. Utilizing resistivity mapping and electrical soundings they revolutionized the field of geophysical exploration. Initially, electrical methods were applied to Tectonic mining surveys of sedimentary deposits, each formation being characterized by its resistivity. Since the position and material properties of the strata, together with the amount of water contained in the strata, affects the electrical properties of the strata, it rapidly became evident that formations could be followed, their thickness determined and permeable areas located. Analogous to the location of permeable areas, Barnes in the 1950's proposed the use of electrical methods for the delineation of sand and gravel deposits. The basis for this proposal was the significant increase in resistivity to be expected by the increase in the granular nature of underlying deposits. These increases in resistivity would thus equate permeability and granularity.

In 1974 the U.S. Geological Survey published a text entitled, "The Application of Surface Geophysics to Groundwater Investigations". This text was instrumental in establishing a basis for the use of electrical resistivity methods in groundwater exploration. The field of electrical techniques has rapidly progressed in recent years by notable advances in field instrumentation and interpretive methods.

Advances in instrumentation has lead to the development of solid state circuitry for power supplies and signal amplification in the receiver. These advances have resulted in lower weight for power capabilities and greater sensitivity. The primary result of increased sensitivity is that the sensitivity may only be limited by internal instrumentation electrical noise. Electrical noise originating from industrial currents or natural earth currents have been significantly reduced by the use of synchronous detection systems, in which the transmitter current and receiver polarity are reversed periodically at a frequency of less than one Hertz. Noise which is asynchronous with the switching frequency is then averaged out.

Theoretical Background

The resistivity of a geologic unit is a function which is determined by the amount of contained water; the quantity of total dissolved salts in the water and the distribution of the water within the unit, that is the amount of void space which may contain water. Thus, the resistivity of most granular soils and rocks is controlled more by porosity, water content and water quality than by the conductivity of matrix materials.

The capacity of a strata to conduct electricity is affected by the number of interconnected spaces (permeability) and the water content. Void spaces must be interconnected and filled with water in order to conduct electricity. The pore volumes may consist of two parts; larger voids which serve as storage locations and finer interconnecting zones. Much of the resistance to current flow is due to the connecting of small sized pores because of their smaller cross section. Thus, a rock with a higher ratio of storage pore volume to connecting pore volume will have a higher resistivity.

Clay minerals such as kaolinite, halloysite, montmorillonite, etc., have the property of absorbing ions in an exchangeable state. Thus, when clay is mixed with water, the exchangeable ions may separate from the clay minerals in a process resembling ionization. These ions render the water in a pore structure conductive, even when the water has no salinity. Most earth materials possess some exchange capacity, therefore, the conductivity of an electrolyte in a pore structure will always be increased by ions supplied by desorption.

The pore structure of a geologic material need not necessarily be filled with an electrolyte as is usually found in strata lying above the regional groundwater table. Most of the pore space is generally filled with air with only the granular surfaces coated with water, termed pellicular water. The resistivity of a material containing only a partial fraction of saturation will generally exhibit a resistivity much higher than the same material fully saturated. Studies of the effect desaturation has on the resistivity of various types of oil reservoir rocks containing saline water have led to recognition of an empirical expression termed Archie's Law:

$$\rho_{a} = \rho_{w} \Psi^{-m}$$

where $\rho_{\!\scriptscriptstyle d}$ is the bulk resistivity of the geologic unit, $\rho_{\!\scriptscriptstyle W}$ is the resistivity of the water contained in the pore structure, and ψ is the porosity expressed as a fraction per unit volume of rock. The terms "a" and "m" are parameters whose values are assigned to allow the equation to fit practical field measurements.

Generally it has been found that "a" is slightly greater than one, and "m" is slightly less than two for granular materials. Thus, as the above equation indicates, the resistivity increases as (approximately) the square of the reduction in water content. It therefore is suggestive that resistivity measurements should be an effective method to determine the degree of saturation and porosity (i.e., grain size distribution).

Field and Interpretive Methods

Vertical electrical soundings (VES) are accomplished by applying a direct current or very low frequency synchronous alternating current to the ground through a pair of electrodes (A & B) and measuring the resulting potential established by this current across a second set of electrodes (M & N). The corresponding resistivity may be calculated according to Ohm's Law as follows:

R = K(E/I)

Where K is a geometric factor depending only upon the relative position of the four electrodes.

In order to study the variation of resistivity with depth, the spacing between the various electrodes is gradually increased. The effect of materials at depth more pronounce with the increased electrode spacing corresponding set of potential measurements. The relationship of electrode spacing to potential distribution is shown in Figure 2R for a uniform homogenous half space.

Interpretation of the corresponding data obtained during an electrical resistivity study has evolved tremendously since the work of the Schlumberger brothers in the 1900's. This evolution has followed a sequence consisting of solution by empirical techniques (circa 1940-1960 to present). The empirical methods involved the assumption of a direct relationship of depth to electrode spacing and in many instances, appeared to produce reasonable results, when the underlying substratum was non-conductive. Curve matching techniques achieved much better results but were however rather limited by the number of published theoretical curves and the complexity of the field curve. Generally, the analysis of a field curve was limited to no more than four layers. There were additional techniques by which a curve could be matched to allow five or more layers, although due to the tedium and inaccuracies introduced by these solutions, such solutions were utilized very infrequently with less than desirable results. During the early to mid-1970's, several investigators began to use high speed digital computers for the analysis of electrical resistivity data. Probably the most predominant interpretive method which has evolved consists of the convolution of the field curve by the application of a series of filter coefficients which are applied for the direct solution of the integral defining the resistivity of a solid earth. Thus, it is possible to develop an electrical model from the field curve with no further input. Currently, it is possible by utilization of computer techniques to easily solve field curves in excess of five layer electrical models.

Dependent upon site conditions and the electrical "target", we may use one or more electrode arrays. In these arrays the current is applied across the outer electrodes. The potential change is measured between two inner electrodes.

ELECTRICAL RESISTIVITY DATA

The interpreted thickness, depths and resistivity values for each sounding are computed as (1) the Dar Zarrouk Reduction of the Detailed Solution and (2) the Detailed Solution to Smoothed VES Curve. The Detailed Solution is the interpreted resistivity solution for an initial estimation of 1 layer per data point. After the initial program pass, this estimation is reduced in the Dar Zarrouk domain, and the remaining layers are resolved until the curve fitting criteria is satisfied. The input data is projected to the preceding decade (in this case 0.1 to 1 metre, AB/2) to resolve the top most layers. The reduced data is based upon the Dar Zarrouk reduction of the detailed solution. The Dar Zarrouk reduction is generally that which we select for the final interpretation. It is noted, however, that the Dar Zarrouk reduction may eliminate some thin layers that may be significant. Both solutions should be inspected to determine layer continuity between adjacent soundings.

ELECTRICAL RESISTIVITY METHODS AND INTERPRETATION

1. EQUIPMENT

A. An AGI Sting R1 electrical resistivity system was used for this study with associated interconnect cables and stainless steel electrodes.

2. ELECTRICAL RESISTIVITY FIELD METHODS

The vertical electrical soundings (VES) were accomplished by applying a D. C. current to the ground through a pair of electrodes and measuring the potential established by this current across a second set of electrodes. In order to study the variation of resistivity with depth, the spacing between the various electrodes was gradually increased. The effect of materials at depth becomes more pronounced with the increased electrode spacing and corresponding potential.

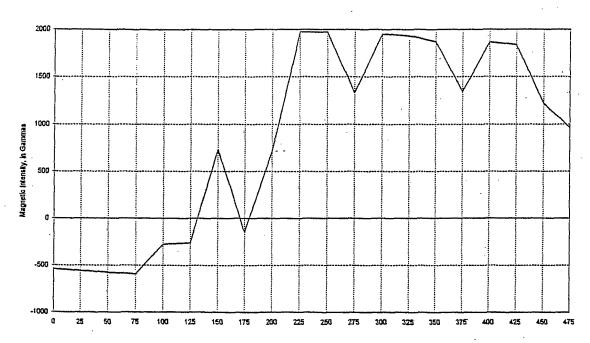
We trust the above will complete your requirements for this project. If you need further clarification or additional information please let us know.

For: Geo Recon International Ltd.

Clyde A. Ringstad

Principal Geophysicist





CH2M-HILL

REYNOLDS ALUMINUM PROJECT TROUTDALE - OREGON

MAGNETOMETER SURVEY

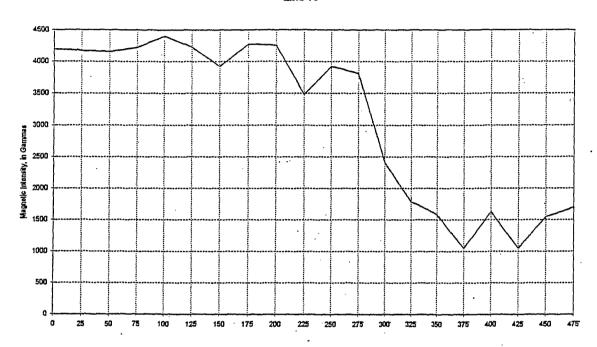
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FIG. 13





REYNOLDS ALUMINUM PROJECT TROUTDALE - CREGON

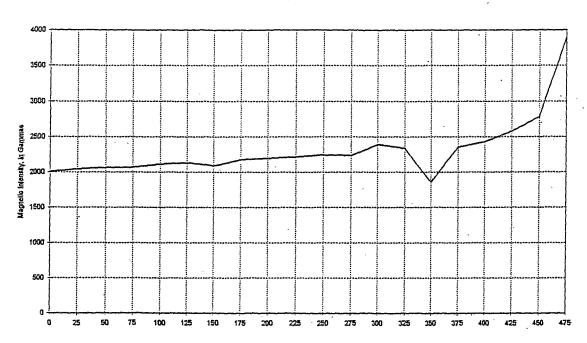
MAGNETOMETER SURVEY

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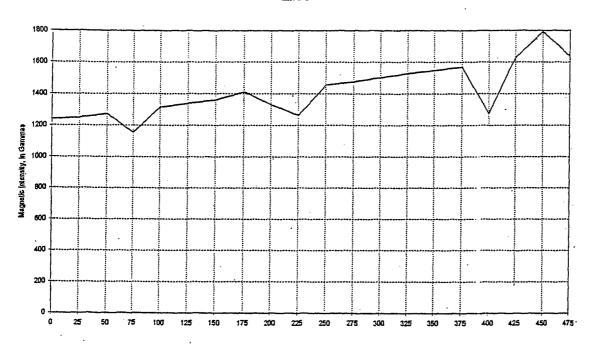
MAGNETOMETER SURVEY

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REYNOLDS ALUMINUM PROJECT TROUTDALE - DREGON

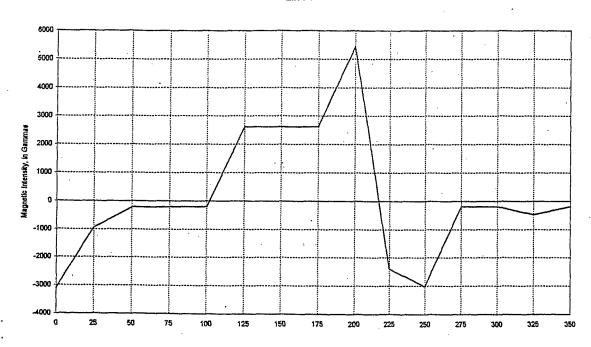
MAGNETOMETER SURVEY

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REYNOLDS ALUMINUM PROJECT.
TROUTDALE - OREGON

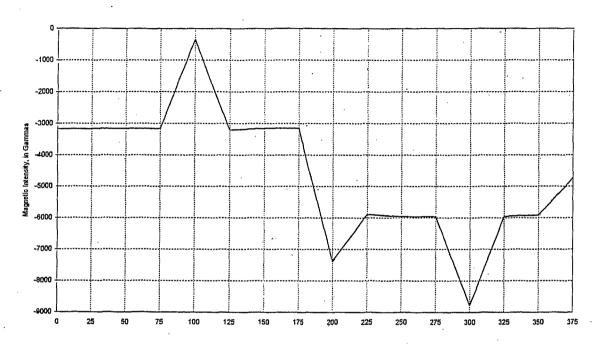
MAGNETOMETER SURVEY

SEPTEMBER 1994

J94-611

GEO-RECON INTERNATIONAL LTD.





REYNOLDS ALUMINUM PROJECT TROUTDALE - OREGON

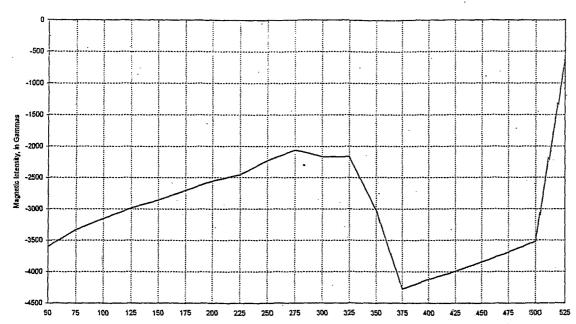
MAGNETOMETER SURVEY

SEPTEMBER 1994

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GED-RECON INTERNATIONAL LTD.





REYNOLDS ALUMINUM PROJECT TROUTDALE - GREGON

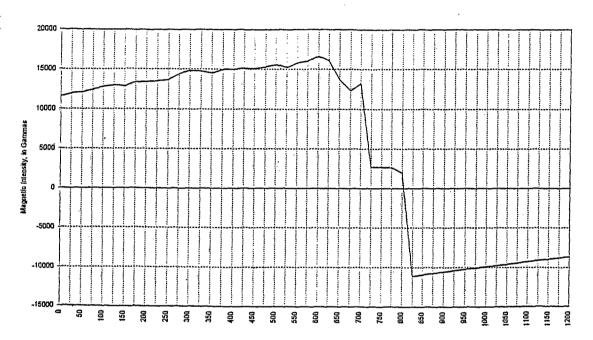
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GEO-RECON INTERNATIONAL LTD.





REYNOLDS ALUMINUM PROJECT TROUTDALE - OREGON

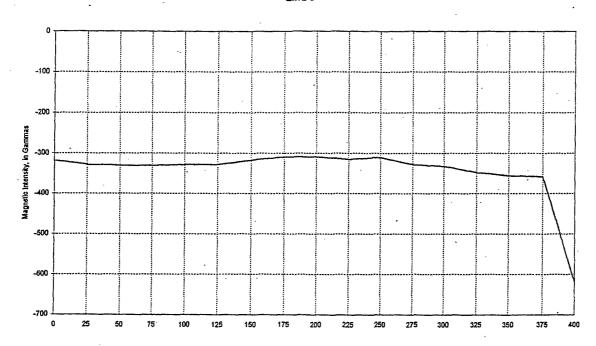
MAGNETOMETER SURVEY

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REYNOLDS ALUMINUM PROJECT TROUTDALE - DREGON

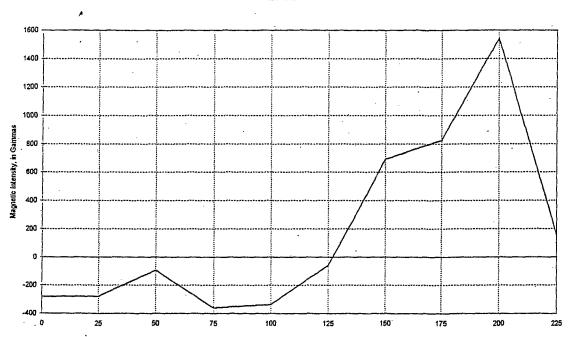
MAGNETOMETER SURVEY

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CH2M-HILL REYNOLDS ALUMINUM PROJECT

MAGNETOMETER SURVEY

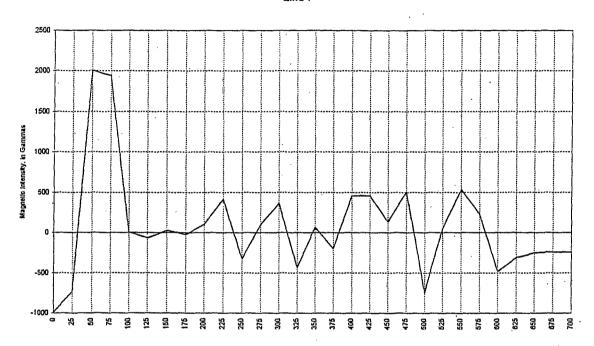
TROUTDALE - OREGON

SEPTEMBER 1884

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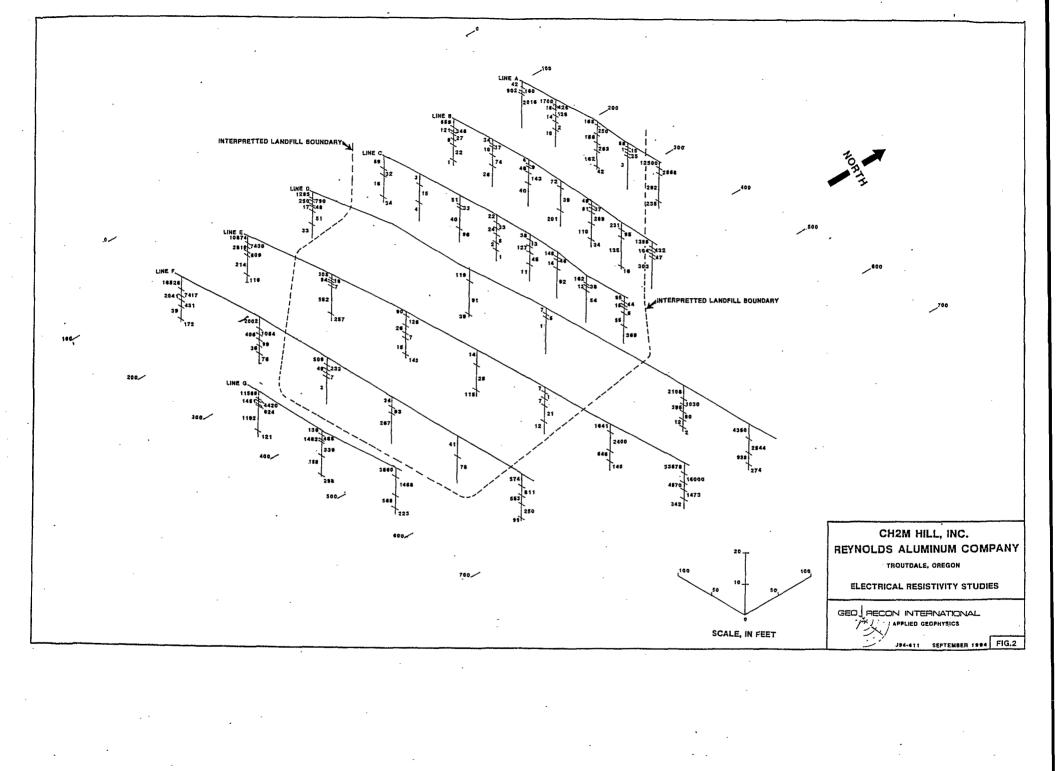
CH2M-HILL REYNOLOS ALUMINUM PROJECT TROUTDALE - OREGON

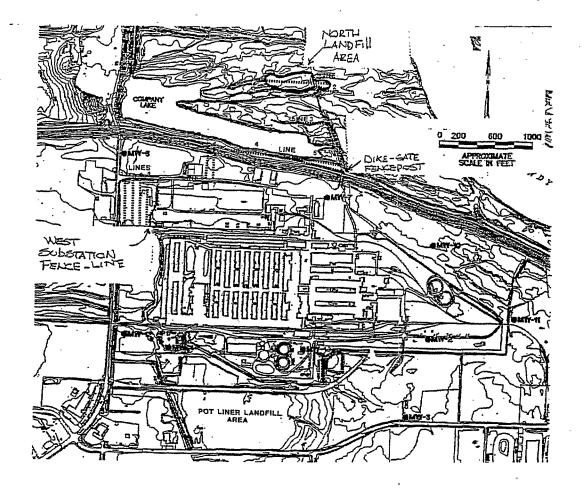
MAGNETOMETER SURVEY

SEPTEMBER 1884

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CH2M-HILL INC. REYNOLDS ALUMINUM COMPANY TROUTDALE - OREGON

LOCATION PLAN MAP

SEPTEMBER 1984

J94-611

GEO-RECON INTERNATIONAL LTD.

Appendix D Monitoring Well Geologic Logs and Well Construction Diagrams



PROJECT NUMBER

WELL NUMBER

OPE39293.B1.01

MW-01

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

LOCATION Old Cryolite Plant PROJECT Reynolds Metals DRILLING CONTRACTOR GeoTech-Mickey MEASURING POINT ELEV (NGVD) __28.25 DRILLING METHOD AND EQUIPMENT HSA 8-1/4" Augers, Canterra 250 10.56 7-18-94 START 7-12-94 FINISH 7-12-94 LOGGER Heidi Hoffmann WATER LEVEL ELEV/DATE . STANDARD PENETRATION TEST RESULTS SOIL DESCRIPTION WELL COMPLETION DIAGRAM SAMPLE 9. (구 DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH BEL SURFACE (RECOVERY FEET AND INTERVAL MOISTURE CONTENT, RELATIVE DENSITY NUMBER 6" -6" -6" OR CONSISTENCY, SOIL STRUCTURE, nscs Cap (N) MINERALOGY SILTY SANDY GRAVEL, GM, brown, angular gravel, dry, fill. Locking Protective Casing-6". | w/3 Protective Bullards _ocking Stickup =3.0 ft. Concrete Pad M/F# 2.5 SILT, ML, v. dk gray, (10YR 3/1), dry, hard, wood pieces, OVM=0.0, ML 12-13-20 S-1 1.5 (33)HCN=0.0. 4.0 Volclay Coarse Bentonite Chips 5.0 5.0 SAND, SP, dk grayish brown, (10YR 4/2), moist, medium sand, 5% silt, 10-22-23 (45) S-2 1.5 dense, Fe-oxide staining. OVM=0.0, 6.5 Centralizer HCN=0.0. 7.5 SAND, SP, dk grayish brown, (10YR 4/2), coarse sand, 5-10% silt, dense, SP 8-20-23 S-3 1.5 (43) moist-wet. OVM=0.0, HCN=0.0. 0.0 9.0 ŝ 10.0 Stainless 4" diameter V-wire wrapped 10 slot Schedule 40 PVC Screen flush-threaded SAND, SP, dk grayish brown, (10YR 4/2), wet, coarse sand, 5% silt. At 11.2":SILT, ML, grayish brown, wet, stiff. 0VM=0.0, HCN=0.0. 10.0 7-8-6 S-4 0.6 (14) 11.5 Sand 12.5 SILT, ML, v. dk gray, (2.5YN 3), wet, soft, plastic. OVM=0.0, HCN=0.0. Colorado Silica 2-3-1 S-5 1.0 (4) 14.0 15.0 15.0 SILT, ML, v. dk gray, (2.5YN 3), wet, firm, plastic. OVM=0.0, HCN=0.0. Drillers smell NH3 downhole. 2-2-3 (5) ML S-6 **n-8** 16.5 Centralizer 17.5 SILT, ML, v. dk gray, wet, plastic, firm, lense of brown plastic, silt, 3" thick. OVM=0.0, HCN=0.0. 3-4-3 S-7 0.6 (7) <u>@</u>_ 19.0 Stainless S 20.0 20.0 SILT, ML, black, (5Y 2.5/1), wet, firm, 2-3-5 plastic. OVM=0.0, HCN=0.0. S-8 1.3 Endcap. Diameter Schedule 40 Flush Treaded PCV (8) 21.5 B0H=20' 25.0



PROJECT	NUMBER	WELL	NUMBER
OPF3929.	3.B1.01	MW-0	2

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

PROJECT Reynolds Metals LOCATION Between Scrap Area & Former Mercury Spill MEASURING POINT ELEV (NGVD) __31.65 DRILLING CONTRACTOR GeoTech-Mickey DRILLING METHOD AND EQUIPMENT HSA 8-1/4" Augers, Canterra 250 WATER LEVEL ELEV/DATE __21.0 T-18-94 START 7-11-94 FINISH 7-11-94 LOGGER Heidi Hoffmann STANDARD PENETRATION TEST RESULTS SAMPLE SOIL DESCRIPTION WELL COMPLETION DIAGRAM USCS DESCRIPTION ¥Ē. DEPTH BEL SURFACE (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, RECOVERY FEET TYPE AND NUMBER INTERVAL 6" -6" -6" MINERALOGY (N) Cab Locking (Stickup =2.67 ft. Locking Protective Casing-6". SILT, ML, v. dk gray, (7.5YRN 3/1), Concrete Pad dry. ML PVC 9 2.5 SILTY SAND, SM, brown, (10YR 4/3), dry, slightly moist at top of fine sand, medium. OVM=0.0, HCN=0.0. 3-8-17 (25) S-1 1.5 SM 4.0 PVC Casing 5.0 5.0 SAND, SP, brown, (10YR 4/3), v. sl. moist, fine sand, well-sorted. S-2 0.8 OVM=0.0, HCN=0.0. 6.5 SP Volclay Coarse Bentonite Chips Blank 7.5 <u>SAND</u>, SP, brown, wet, medium, fine sand. At 8':<u>SILTY SAND</u>, SM, brown, wet. 0VM=1.0, HCN=0.0. 7-9-10 S-3 1.5 9.0 SM 10.0 10.0 ML SILT. ML, grayish brown, wet, soft. At 10.5':CLAY, CL, v. dk (7.5YRN 3/1), wet, plastic, firm, Fe-oxide 1-2-3 5-4 1.5 (5) 11.5 Centralizer staining. OVM=0.5, HCN=0.0. CL 12.5 SILTY CLAY, CL, v.dk gray, Fe-oxide staining, wet, firm. 3-3-4 S-5 1.5 (7) <u>0</u> SILTY SAND, SM, brown w/gray mottled, wet. OVM=0.0, HCN=0.0. 14.0 SM ភ 15.0 tainless 15.0 SANDY SILT, ML, dk gray, wet, toose, fine sand, 20-30% sand, Fe-oxide staining. OVM=0.0, HCN=0.0, Sand 3-4-6 S-6 1.5 ML l slot Screen (10) 16.5 20x40 Colorado Silica 17.5 SAND. SP, gray, (7.5YR 4/N3), fine sand. Middle 6", SILTY SAND, SM, wet, loose. OVM=0.0, HCN=0.0. SP 4" diameter 10 Schedule 40 PVC 3-3-4 S-7 1.5 SM (7)19.0 SP 20.0 20.0 SILT SAND, SM, dk gray, (7.5YR 4/N3), wet, lenses of fine sand, loose. OVM=0.0, HCN=0.0. Centralizer 4-4-5 S-8 1.5 (9) 21.5 22.5 SM SILTY SAND, SM, dk gray, (5YR 4/1), wet, loose, Fe-oxide. Steel **V** 4-4-6 (10) * S-9 1.5 24.0 Stainless Bottom 6":SAND, SP, dk gray, wet, medium sand, well-sorted. OVM=0.0, Treated End Cap Schedule 40 PCV 25.0 HCN=0.0. B0H-24' SP . Fig



WELL NUMBER

MW-03

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

PROJECT Reynolds Metals LOCATION Graham Road DRILLING CONTRACTOR GeoTech-Mickey MEASURING POINT ELEV (NGVD) __29.69 DRILLING METHOD AND EQUIPMENT HSA 6 1/4" Augers Canterra 250 START 7-9-94 FINISH 7-9-94 LOGGER Heidi Hoffmann STANDARD PENETRATION TEST RESULTS SAMPLE SOIL DESCRIPTION WELL COMPLETION DIAGRAM USCS DESCRIPTION ¥Ē. RECOVERY FEET DEPTH BEL SURFACE SOIL NAME, USCS GROUP SYMBOL, COLOR TYPE AND NUMBER INTERVA MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, 6" -6" -6" MINERALOGY (N) Cap Concrete 6" Diameter Locking Mild Steel. Protective Casing w/3 Bullards Locking (Stickup =2.5 ft-SILTY, ML, dk brown, dry. ML **PVC Casing** 2.5 SAND, SP, strong brown, (7.5YR 4/6), wet, fine, dense. At 3.5': SILT. ML, v. dk gray, (10YR 3/1), wet. OVM=0.0, HCN=0.0. 17-18-16 SP S-1 0.6 (34) Volclay Coarse Bentonite Chips 4.0 ML 5.0 5.0 SAND. SP, v. dk gray, (10YR 3/1), wet, medium, fining downward from medium to fine sand. OVM=0.0, 8-9-17 1.5 5-2 (26)6.5 Centralizer HCN=0.0. 7.5 SAND, SP, v. dk gray, (10YR 3/1), wet, medium, fine sand, ~10% silt, Fe-oxide in top of spoon. OVM=0.0, 6-8-12 S-3 1.5 (20)<u>®</u> **♦** 9.0 HCN=0.0. ŝ SP 10.0 Sand lainless 10.0 SAND. SP. v. dk gray, (10YR 3/1), wet, medium v. fine sand, well-sorted. OVM=0.0, HCN=0.0. 2" diameter 10 slot Schedule 40 PVC Screen Flush-threaded 7-12-14 5-4 1.5 Silica (26)11.5 ñ SAND, SP, v. dk grayish brown, (10YR 3/2), wet, medium, v. fine sand, well-sorted. OVM=0.0, HCN=0.0. 12.5 Colorado 6-12-6 (18) S-5 1.5 14.0 20x40 Centralizer 15.C 15.0 SILTY SAND, SM, dk grayish brown, (10YR 3/2), wet, loose, wood chunks. OVM=0.0, HCN=0.0. 1-2-3 (5) 5-6 0.6 16.5 <u>a</u> **(** SM 17.5 S SILTY SAND, SM, v.dk grayish brown, ainless 1-3-2 (5) (10YR 3/2), wet, loose. OVM=0.0, S-7 1.5 HCN=0.0. 19.0 20.0 BOH=18 25.0



WELL NUMBER

MW-04

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

PROJEC	T Rey	nolds Me	tals					r drain	age ditch	SW por	tion	of site	
MEASU	RING PO	INT EL	EV (NG	VD) <u>26.91</u>	DRILLING CONTRACTOR G	eoTech-S	tan						
		HOD ANI ELEV/D		MENT <u>HSA 8 1/</u> 16.45 7-15-94	'4" Augers Conterra 250START 7-12-94	FINISH	7-12-	94	1.06	sep H	eidi	Hoffmann	
		SAMPLE		STANDARD	SOIL DESCRIPTION		T					DIAGRAM	
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	RECOVERY FEET	PENETRATION TEST RESULTS 6" -6" -6" (N)	SOIL NAME, USCS GROUP SYMBOM MOISTURE CONTENT, RELATIVE OR CONSISTENCY, SOIL STRUCT MINERALOGY	L, COLOR, DENSITY URE,	USCS DESCRIPTION	Cap					
<u>-</u> -	2.5	S-1	1.2	7-7-10 (17)	SILI, ML, grayish brown, (10YR dry, black carbon staining plus carbon pieces stiff NVM=0.0	black		Locking		XXX	XXX	Blank PVC Casing	6" Diameter Locking Mild Steel. Protective Casing w/3 Bullards
-	4.0			(1/)	carbon pieces, stiff. OVM=0.0, HCN=0.0.		-		> a ; ;			₹ P	ter L
5.0 — _	5.0 6.5	S-2	1.5	5-6-7 (13)	SILT. ML, grayish brown, (10YR sl. moist, black carbon staining Fe-oxide. OVM=0.0, HCN=0.0.	5/2), , stiff,	ML -	er	Volclay Coarse Bentonite Chips			Blar	6" Diame Protectiv
_	7.5				*** *** *** *************************		-	Centralizer	*	A	4		, 4
-	9.0	S-3	1.5	4-5-6 (11)	SILT, ML, black, moist, stiff, abundent roots and wood, appet to be a recent surface. OVM=0HCN=0.0.	ears D.O,		Steel Cer	-			*	-
10.0 —	10.0				<u>SILT</u> ML, dk gray, (10YR 4/1), v	vet,	-	ess 5	`				4
10.0	11.5	S-4	1.2	7-13-14 (27)	v. stiff, well-graded. OVM=0.0 HCN=0.0.	,	_	Stainless	a Sand			- ua	-
_	12.5	S-5	0	5/1.5'	No recovery.				20x40 Colorado Silica Sand			2" diameter 10 slot Schedule 40 PVC Screen Flush-threaded	-
15,0	15.0								Color			amet e 40 sh-th	
19,0	16.5	S-6	1.5	7-8-7 (15)	CLAY, CL, v. dk gray, wet, stiff plastic. QVM=0.0, HCN=0.0	,	CL	izer	20x40			2" di Schedul Flus	
-	17.5 ,				CLAY, CL, v. dk gray, (10YR 4)	(1).	-	ntraf					4
-	19.0	S-7	1.5	5-6-7 (13)	wet, stiff, plastic. OVM=0.0, HCN=0.0.	•••	_	Steel Centralizer	-			*	
20.0 —	20.0	S-8	1.5	5-6-9	CLAY, CL. v. dk gray, (10YR 4) wet, stiff, plastic, siltier at bott	/1), tom.		Stainless	__			- J	- -
25.0 —	21.5			(15)	B0H=20'			St				End Cap, Schedule 40 PVC.	Z. Diameter Flush-Inread



WELL NUMBER

MW-05

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

PROJE	T Rey	nolds Me	etals		**************************************			r Sandy River		
		INT ELI			DRILLING CONTRACTOR _ 4" Augers Canterra 250	GeoTech-M	lickey			
		ELEV/D		12.65 7-18-94	START 7-8-94	FINISH	7-8-9	14 LOG	GER Heidi	Hoffmann
MC (L.		SAMPLE		STANDARD PENETRATION	SOIL DESCRIPTION		- z	WELL CO	MPLETION	DIAGRAM
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	RECOVERY -	STANDARD PENETRATION TEST RESULTS 6" -6" -6" (N)	SOIL NAME, USCS GROUP SYMB MOISTURE CONTENT, RELATIVE OR CONSISTENCY, SOIL STRUC MINERALOGY	EDENSITY	USCS DESCRIPTION	Cap		
-	2.5			- 0	SAND, SP, dk grayish brown,			Locking C PVC Stickup =2.32 ft Concrete Pad		C Casing 6" Diameter Locking Mild Steel
	4.0	S-1	1.5	7-8-14 (22)	4/2), dry, medium, medium- co sandy, loose. OVM=0.0, HCN=		SP -			er Loc Casin
5.0 —	5.0	S-2	1.5	7-10-9	SAND, SP, dk grayish brown, 4/2), v. sl. moist loose. OVM	(10YR =0.0.	_			asing Diametr
_	6.5	5-2	1.5	(19)	4/2), v. sl. moist, loose. OVM HCN=0.0. At 6':SILT, ML, gray Fe-stained, mottled, v. moist.	and and		e ≤		Blank PVC Casing 6" Diame
-	7.5 9.0	S-3	1.5	5-6-5 (11)	SILT, ML, gray and Fe-oxided staining, mottled, v. moist to v plastic, stiff. OVM=0.0, HCN=1	vet,		Volclay Coarse Bentonite Chips		— Blank
10.0 —	10.0			3-9-3	SILTY CLAY, ML/CL, dk brown					_
-	11.5	S-4	1.5	(12)	w/gray and Fe-oxide staining mottled, plastic, wet, stiff. OV HCN=0.0.	/м=0.0,				
-	12.5	S-5	1.5	2-1-2	SILT, ML, dk grayish brown, w soft, Fe-oxide and gray mottl vertical streaks. OVM=0.0, HCN=0.0.	et, ed	ML -	Centralize		
15.0 —	15.0			3-4-7	SILT, ML, dk grayish brown, w stiff, 10-20% fine sand, less	et,	<u> </u>	S S S S S S S S S S S S S S S S S S S		
-	16.5	S-6	1.5	(11)	Fe-oxide. OVM=0.0, HCN=0.0		-	Stainless a Sánd –		
-	17.5	S-7	1.5	7-2-8 (10)	<u>SILT</u> , ML, dk grayish brown, w stiff, plastic, stringers of <u>SIL</u> <u>SAND</u> , SM, fine-medium sand.	et, TY	SM ML 7	Stainles 20x40 Colorado Silica Sánd		2" diameter 10 slot Schedule 40 PVC Screen Flush-threaded
20.0 —	20.0				CANDY CILT ON disconside h		_	Color	1 1-1 1	eter 1 10 Pvi 1hrea
	21.5	S-8	1,5	4-5-4 (9)	SANDY SILT, SM, dk grayish borange, Fe-oxide and gray restaining, wet.		_	20x40		2" diam edule 4 Flush-
-	22.5				<u>SILTY SAND,</u> SM, dk grayish b	ırnwn	SM ⁻	alizer		
-	24.0	S-9	1.5	5-6-6 (12)	wet, medium, fine-medium sand			Centralize		nedule smeter sded
25.0 —					B0H=25.2'		_	S Stee		End Cap, Schedule 40 PvC 2" Diameter Flush-threaded
-							-	Stainless		End C 40 PV Flusi
-		,					-			_
	<u> </u>							,		_



WELL NUMBER

MW-06

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

LOCATION Field on NE corner of Sundial & Reynolds Plants PROJECT Reynolds Metals MEASURING POINT ELEV (NGVD) 26.81 DRILLING CONTRACTOR GeoTech-Mickey DRILLING METHOD AND EQUIPMENT HSA 6 1/4" Augers Conterra 250 WATER LEVEL ELEV/DATE 11.79 7-13-94 START 7-8-94 LOGGER Heidi Hoffmann FINISH 7-8-94 STANDARD PENETRATION TEST SAMPLE SOIL DESCRIPTION WELL COMPLETION DIAGRAM SE USCS DESCRIPTION DEPTH BEL SURFACE RECOVERY FEET SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, TYPE AND NUMBER RESULTS INTERVAL -6" -6" MINERALOGY (N) Sap Concrete Pad Locking 6" Diameter Locking Mild Steel Protective Casing w/3 Bullards Stickup =2.7 ft. SP PVC 2.5 SAND. SP, dk grayish brown, {2.5Y 4/2}, dry, medium, fine-medium sand, lenses of SILTY SAND, SM. OVM=0.0, HCN=0.0 SM 5-7-8 S-1 1.5 (15) 4.0 SP **PVC Casing** 5.0 5.0 SILTY SAND, SM, dk brown, (10YR 3/3), wet. At 6':SILT, ML, dk grayish brown, (10YR 4/2), v. moist, SM 1-4-2 S-2 1.5 (6) 6.5 Fe-oxide staining, stiff. OVM=0.0, Coarse Bentonite Chips HCN=0.0. 7.5 SILT, ML, dk grayish brown, (10YR 4/2), v. moist, Fe-staining, root casts, plastic, stiff. 0VM=0.0, 3-4-5 S-3 1.5 9.0 HCN=0.0. 10.0 10.0 SILT, ML, dk grayish brown, wet, firm, 5-10% fine sand in stringers, Fe-oxide staining. OVM=0.0, 3-3-3 5-4 1.5 Centralizer (6) 11.5 HCN=0.0. 12.5 SILT, ML same as above. ML 2-5-6 ⊕ **♦** S-5 1.5 14.0 ŝ ainless 15.0 15.0 SILT, ML, same as above. 4-4-5 Sand S-6 1.5 (9) 2" diameter 10 stot Schedule 40 PVC Screen Flush~threaded 16.5 20x40 Colorado Silica 17.5 SILT, ML, same as above. 3-3-4 S-7 1.5 19.0 20.0 20.0 SAND, SP, v. dk grayish brown, (2.5YR 3/2), wet, medium sand. S-8 1.5 SM Centralizer (13)21.5 Schedule 40 "Diameter threaded SILTY SAND, SM, center of spoon. 22.5 SAND, SP, v. dk grayish brown, (2.5YR 3/2), wet, medium sand, loose, 10-15% silt. 2-3-3 (6) <u>a</u> ♦ S-9 1.5 24.0 ŝ End Cap, 5 PVC 2" Flush-t ainless 25.0 BOH=25'



WELL NUMBER

MW-07

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

LOCATION North Parking Lot PROJECT Reynolds Metals DRILLING CONTRACTOR GeoTech-Mickey MEASURING POINT ELEV (NGVD) __28.38 DRILLING METHOD AND EQUIPMENT HSA 8 1/4" Augers Conterra 250 START 7-9-94 WATER LEVEL ELEV/DATE 13.13 7-14-94 FINISH 7-9-94 LOGGER Heidi Hoffmann STANDARD PENETRATION TEST RESULTS SAMPLE SOIL DESCRIPTION WELL COMPLETION DIAGRAM QT. USCS DESCRIPTION DEPTH BELO RECOVERY FEET SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, TYPE AND NUMBER INTERVA 6* -6* -6* (N) ASPHAL ameter-ft bgs SILTY SANDY GRAVEL, GM, v. dk Cab brown, dry. Sherwood Flush Mount 8" Diamet PVC is 0.35 ft b 2.5 Locking SILTY SAND. SM, v. dk grayish brown, (10YR 3/2), wet at bottom of ss, medium. OVM=0.0, HCN=0.0. 9-9-6 S-1 0.8 (15) SM 4.0 Collect duplicate sample. Dollar 5.0 SILT W/SAND, ML, v. dk grayish brown, (10YR 3/1), moist-wet in sand stringers, medium, sand is fine, silt is plastic. OVM=0.0, HCN=0.0. 5.0 4-6-11 S-2 1.0 ML (17) 6.5 Coarse Bentonite Chips PVC 7.5 SILTY SAND, SM, v. dk grayish brown, (10YR 3/2), v. sl. moist sand is fine, medium, mica flakes. Blank 5-9-9 S-3 (18)9.0 OVM=0.0, HCN=0.0. 10.0 10.0 SILTY SAND. SM, brown, (10YR 3/3), moist, wet at bottom of ss, medium, mica. OVM=0.0, HCN=0.0. 4-5-6 (11) 1.3 11.5 Centralizer SM 12.5 SILTY SAND. SM, brown, (10YR 3/3), wet, loose, mica. OVM=0.0, 2-2-6 (8) S-5 1.5 HCN=0.0. <u>a</u> ♦ 14.0 St 15.0 Stainless 15.0 SILTY SAND, SM, brown, mottled with brown gray reduced areas, wet, loose. OVM=0.0, HCN=0.0. 2-3-5 S-6 1.5 Sand (8) 16.5 diameter V-Wire Wrap PVC, 10 Slot Screen Flush-threaded Silica 17.5 SILT W/SAND, ML, dk. grayish brown, (10YR 3/2), wet, firm, mottled gray. 10% Fe-oxide staining. OVM=0.0, 4-3-3 S-7 1.5 Colorado (6) 19.0 HCN=0.0. 20.0 20.0 SILT, ML, mottled gray and rust (Fe-oxide), wet, firm, interbedded with thin layers of fine silty sand and 20x40 2-2-6 5-8 1.5 ML (8)21.5 Centralizer sandy silt, silt is stiff. OVM=0.0, HCN=0.0. 22.5 End Cap, Schedule 40 PVC 2" Diameter Flush-threaded SANDY SILT. ML, mottled as above, wet, firm, sand is fine. 3-3-5 (8) 5-9 1.5 8 24.0 ซ Stainless 25.0 BOH=25'



WELL NUMBER

MW-08

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

PROJEC				05.30				r Columbia River L	,		Gompo	nry Lane
	RING PO				DRILLING CONTRACTOR GeoTec	II-MI	скеу					
				MENT H3A 0 1/ 17.24 7-12-94	4" Augers Canterra 250 START 7-7-94 FINI	SH .	7-7-9	04 LOG	SER H	eidi F	loffmar	าก
		SAMPLE			SOIL DESCRIPTION		7	WELL CO	MPLETI	ON E	DIAGRA	М
DEPTH BELOW SURFACE (FT)	VAL	AND R	ЕВҮ	STANDARD PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSI OR CONSISTENCY, SOIL STRUCTURE,	OR,	USCS DESCRIPTION		П	ľ	T	
DEPTH SURFA	INTERVAL	TYPE AND NUMBER	RECOVERY FEET	6" -6" -6" (N)	OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			G C C			Address of the same of the sam	
							-	Locking PVC Stickup = 2.4 ft		X	A STATE OF THE STA	6" Diameter Locking Mild Steel Proteclive Çasing w/3 Buljards
-	2.5 4.0	· S-1	1.5	Spoon broke	SILTY SAND, SM, dk brown, (10YR 3/3), v. sl. moist. OVM=0.0.		SM-	PVC:			***************************************	. Locking Jasing w/
	5.0											eter ive (
5.0 —	6.5	S-2	1.5	7-8-12 (20)	SILTY SAND, SM, dk brown, (10YR 3/3), sl. moist, medium.	,					- Bu	8" Diam Protect
_	7.5				At 6.2': <u>SAND</u> , SP, salt & pepper, sl. moist, medium-coarse sand. OVM=0.0.		_	m			C Casi	
-	9.0	S-3	1.2	7 - 6-9 (15)	SAND, SP, salt & pepper, v. sl. moist, medium-coarse, medium. OVM=0.0.	i	_	Volclay Coarse Bentonite Chips			Blank PVČ Casing	-
40.0	10.0	-					SP	>08-			- B	
10.0	11.5	S-4	1.3	4-5-5 (10)	SAND, SP, salt & pepper w/red, v. sl. moist, loose. OVM=0.0.		_				The second secon	-
_	12.5						_	0.1				-
_	14.0	S-5	1.3	5-7 - 8 (15)	SAND, SP, salt & pepper, moist-wet, medium, 6" of SM/ML, dk brown, (10YR 4/3), wet. OVM=0.0.		SM/ML	nd 20x4			ani-permitte de contraction de contr	_
-	15.0						_	SS *	FI			-
15.0 —	16.5	S-6	1.3	6-6-14 (20)	SAND, SP, salt & pepper, wet, medium, ~5% silt. OVM=0.0.		-	Supreme Sand 20x40		-		·
_	17.5						-	4			<u>.</u>	_
_	19.0	S-7	1.2	5-6-6 (12)	<u>SAND</u> , SP, salt & pepper, wet, medium, medium-coarse, loose. OVM=0.0.		_	Sand —				
	20.0						, -	a Se			 -	-
20.0 —	21.5	S-8	1.2	4-6-5 (11)	<u>SAND</u> , SP, same as above. OVM=0.0.		SP_	20x40 Colorado Silica	1 1-1		Scree ded	-
_	22.5				•		_	olora	1 🗐		ter # PVC hrea	-
-	24.0	S-9	1.2	5-5-6 (11)	<u>SAND</u> , SP, same as above. OVM=1.1.		ī	0x40 C			2" diameter 10 slot Schedule 40 PVC Scree Flush-threaded	-
_	25.0						-	7			2's Sche	_
25.0 — -	26.5	S-10	1.1	7-7-14 (21)	<u>SAND</u> , SP, salt & pepper, wet, medium, ~5% subrounded pebbles. OVM=0.0.		-			***************************************		
-				•			_					End Cap, Schedule 40 PVC 2" Diameter Flush-threaded
					B0H=28'		_	 -		3		End Ca 40 PVC Flush
											···	- 4



PROJECT NUMBER WELL NUMBER

OPE39293.B1.01 MW-09

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

SHEET 1 OF 1

PROJECT RMC Troutdale LOCATION N. Landfill

MEASURING POINT ELEV (NGVD) 29.27 DRILLING CONTRACTOR GeoTech Exploration

DRILLING METHOD AND EQUIPMENT 6 3/4" ID HSA

WATER	LEVEL	ELEV/D	ATE		START <u>8/4/94 8:30 AM</u> FINISH .			L	OGGER Phi	Brown	<u> </u>
¥ (F		SAMPLE		STANDARD PENETRATION	SOIL DESCRIPTION	J z	WELL COMPLETION DIAGRAM				
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	RECOVERY FEET	STANDARD PENETRATION TEST RESULTS 6" -6" -6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	USCS	de				
-	2.5				SANDY SILT W/GRAYEL, SM, loamy. 5% gravel to 1" angular, basaltic, dry, It. gray/brown, firm. SILTY SAND, SM, It. brown, damp,		Locking C	*		K X M	6" Diameter Locking Mild Steel Protective Casing w/3 Bullards
5.0 —	5.0	· · · · · · · · · · · · · · · · · · ·		5-6-7 (13)	medium fine, some minor coarse salt and pepper sand.	SM	Concrete Pad				r Locking Casing w/
5.0 -	7.5			5-10-10 (20)	As above 6"; then coarser to med. Less silt, SM/SP, mottled reduction at base, some clay nodules (5%).					chedule 40 PVC Casing	"Diamete otective
-	10.0			4-5-7 (12)	4" SM as above, then <u>SAND</u> , SP, medium, It. brown, damp, loose.			4" Chips -		er, Schedt	ωď
10.0	12.5			8-12-10 (22)	4" SM, brown/gray, mottled, damp firm. Then <u>SAND</u> , SP, salt & pepper, s. moist, medium-coarse, loose.	SP	1	Voiclay 3/4" Chips		2" Diameter, Sc Flush-threaded I	
15.0 —	15.0			4 - 6-8 (14)	As above; moist to wet.		-				
- 0.61	17.5			9-9-8	<u>SAND</u> , SP, darker, coarser salt and pepper, more angular. Columbia River sand (?), v. moist.						_
-	20.0			6-8-9 (17)	As above. Wet at base, minor fine layer at 19.5'.		Centralize	*			
20.0 —	22.5			3-6-7 (13)	As above, wet.	_	less Steel	Silica Sand		>	-
-	25.0			4-9-11 (20)	As above. 0.5" silt layer at 24', red staining below silt.	SP	Stainless	0		chedule 40	
25.0 — -	27.5			3-4-5 (9)	As above. Silty clay layer=1.5' thick.	-	Jez	CSSI 20x40 Colorad		2" Diameter Sch Flush-threaded P	-
-					SP as above. 6" recovery.		Centralize	. CSSI 2(2" [Flush	adule 40 Secured Ig
30.0 — -							Stainless Steel				2" Diameter Schedule 40 PVC Silt Trap w/Secured Bottom Plug
-							Stai				2" Diar PVC Si



27.5

PROJECT NUMBER WELL NUMBER OPE39293.B1.01

MW-10

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

SP

PROJECT RMC Troutdale LOCATION Tank Area DRILLING CONTRACTOR GeoTech Exploration MEASURING POINT ELEV (NGVD) 30.28 DRILLING METHOD AND EQUIPMENT 6 3/4" ID HSA START 8/5/94 8:30 AM LOGGER Phil Brown WATER LEVEL ELEV/DATE FINISH STANDARD PENETRATION TEST RESULTS SAMPLE SOIL DESCRIPTION WELL COMPLETION DIAGRAM ¥.(F DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH BEL SURFACE (RECOVERY FEET AND NTERVAL TYPE ANI NUMBER MOISTURE CONTENT, RELATIVE DENSITY 6* -6* -6* OR CONSISTENCY, SOIL STRUCTURE. nscs (N) MINERALOGY Locking Cap 6" Diameter Locking Mild Steel Protective Çasing w/3 Bullards Silty loam gray, dry, firm, roots and 4" Diameter, Schedule 40 Flush-threaded PVC Casing organic matter. Volclay 3/4" Chips 🕶 2.5 Concrete Pad SILT W/SAND, ML, brown w/gray mottling, dry to damp, medium, roots, 30-40% very fine sand. ML 5-5-5 (10) 5.0 5.0 SAND, SP, brown w/gray mottling, damp, loose, very fine, 30% silt. Centralize 3-7-5 SP (12) 7.5 SILT W/SAND, ML, brown w/gray mottling, moist, medium, increasing fine and plastic at 9'. ឆ 4-3-3 (6) lainless 10.0 10.0 SILI, ML, brown, moist to wet, medium, plastic, 10% very fine sand, 1-3-2 (5) 12.5 Same as above, wet, plastic, 10-20% CL. Sand 4" Diameter Schedule 40 Flush-threaded PVC Screen 1-1-1 (3) Silica 15.0 15.0 SILT. ML, as above, grayer, <5% sand, 10% clay. 20x40 Colorado 1-1-2 ML 17.5 SILT, ML, as above, some macro-pores, very wet. 0-0-2 cssi (2) 20.0 20.0 SILT, ML, as above. Schedule 40 ap w/Secured om Plug 0-0-3 tainless Steel Centralizer 22.5 SILT. ML, as above, gray w/prown mottling, 20% v. fine sand. iameter Sc Silt Trap v Bottom f 1-2-3 25.0 25.0 SILT, ML, grading to sand (SP) at base, gray, wet, loose, sand very fine, 20% silt. PVC S 1-2-4



WELL NUMBER

MW-11

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

		Troutd			LOCATI				
MEASU	RING PO	INT EL	EV (NG		DRILLING CONTRACTOR GeoTech E	xplora	tion		 - ,
				MENT 6 3/4" I	D HSA	0 /5 //	24	OGGER Phil Br	
WATER		ELEV/D			START 8/4/94 FINISH	8/5/	· 		
DEPTH BELOW SURFACE (FT)		SAMPLE		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	- I ≥	WELL	COMPLETION	DIAGRAM
띰핑	VAL	AND S.R	ERY	RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE,	I di		ΙπΙ	· 🛧 🚶
EPT.	INTERVAL	TYPE AND NUMBER	RECOVERY FEET	6" -6" -6" (N)	OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	USCS DESCRIPTION			
<u> </u>	=	ΉŽ	8.0	, , , , , , , , , , , , , , , , , , ,	SAND W/SILT AND GRAVEL,	155			2" Diameter, Schedule 40 Flush-threaded PVC Casing
-					ML/SP/GW, fill, It. gray to tan, dry, loose.	ML	Locking		dule C Ca C Ca Ullar
1 -	2.5								2" Diameter, Schedule 40 Flush-threaded PVC Casin Flush-threaded PVC Casin 6" Diameter Locking Mild Steel- Proteclive Casing w/3 Bullards
-	2.0				SAND. SP, brown damp, loose, no layering, medium-loose (fill).		Concrete Pad-		er, S adeo cking ng w
				7-7-8 (15)	(a,) () () () () () () () () ()	SP	rete		amet thre r Lo
5.0	5.0			(15)			Conc ay 3		ush- ush- nete iive
3.0					SILTY CLAY/CLAYEY SILT, ML/CL, brown w/red mottling, damp, dense.		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Pilon Dian Otec
				3-4-4 (8)	5% fine sand.	ML/C			Prc 9
	7.5				CAND W/CILT CD brown wot		<u> </u>		* -
				0.3.4	SAND W/SILT, SP, brown, wet, medium. 25% silt.		izer		_
-				2-3-4 (7)			Centralizer		, S
10.0	10.0				SAND W/SILT. SP, as above; finer,	-	Sa Sa		e 40 cree
				2-2-2	closer to SP-ML.		Steel		eduli VC S
				2-2-2 (4)	•		ess ado		Sch ed P
	12.5				SAND W/SILT, brown to gray, variable silt layering soft to medium	БР/М	Stainless Steel Central Steel		2" Diameter Schedule 40 Flush-threaded PVC Screen
				1-2-3 (5)	gray.		S 40 C		Diam 1-th
	15.0			(5)	·		Š [2" [-
15.0					Same as above.	-	SSI		Schedule 40 W. Secured on Plug
-				2-2-2 (4)			1 - 1	且	Secu
	17.5			``'			┤ <u>┌</u> ╸		Sche -
-					Same as above. Last 6"=ML.	ļ	11 - 1	V	meter Scill Trap v
				1-2-3 (5)		ML	ralizer	. L	Diameter C Silt Tra Botto
20.0	20.0				Same as above; 1st 6" ML.			•	2" D PVC
				2-4-3	Same as above, ist of rie.		Steel Cen		_
				2-4-3 (7)		SP/M	Ste		
	22.5					-	Stainless		-
							Stair		-
							-		-
25.0 —						-	1		<u>-</u>
-							-		• -
-				Processing			-		
							1		,
							1		
									·



WELL NUMBER

MW-12

SHEET 1 OF 1

MONITORING WELL GEOLOGIC AND CONSTRUCTION LOG

		Troutd				LOCATIO				
					DRILLING CONTRACTOR	GeoTech Ex	plorat	ion	·	
		HOD AN ELEV/D		MENT 6 3/4" I	START 8/4/94	FINISH .	··		GGER Phil Br	מאס
		SAMPLE		STANDARD	SOIL DESCRIPTION	FINISH .	T		COMPLETION (
DEPTH BELOW SURFACE (FT)	INTERVAL	TYPE AND NUMBER	RECOVERY FEET	PENETRATION TEST RESULTS 6" -6" -6" (N)	SOIL NAME, USCS GROUP SYMBOUSTURE CONTENT, RELATIVE OR CONSISTENCY, SOIL STRUCMINERALOGY	OL, COLOR, E DENSITY TURE,	USCS DESCRIPTION	dec		T
_	2.5				LOAMY SILT W/GRAVEL, ML, dr gray/brown, firm. <5% gravel. Angular basalt to 3/4" diameti	•	-	Locking		hedule 40 PVC Casing 6" Diameter Locking Mild Steel-
-	5.0			4-7-9 (16)	SILT, ML, dk. gray to It. gray/brown, dry to damp, firm. red staining, roots and organic debris. 5% very fine sand.	Some	- Control of the Cont	Concrete Pad		10 ing eter Lockin ve Çasing v
5.0 — - -				6-6-3 (9)	Top 6": <u>SAND,</u> SP, fine to medic gray, moist, loose. Bottom 6": ML, gray, v. fine, wet, firm.	ım, it. SILT.	SP	-		2" Diameter, Schedule 40 Flush-threaded PVC Casing 6" Diameter Protective
_	7.5			1-2-1 (3)	SILI, ML, gray, wet, soft, some debris, 10-20% clay.	e root		izer Volclay 3/4" Chips		" Diameter, Ish-thread
10.0 —	10.0			1-2-1	SILT W/SAND, ML, gray, wet, s 20% v. fine black sand,	oft.	ML	Steel Centralizer		- F
-	12.5			1-1-2 (3)	SILT, ML, as above. 20-25% of firmer.	clay,	-	Stainless Ste		dule 40
15.0 —	15.0 17.5			0-1-2 (3)	SAND W/SILT, SP, dk. gray, w soft to medium, v. fine sand, 3 (coarser).	et. 30% silt		Centralizer		2" Diameter Schedule 40 Flush-threaded PVC Screen
-				1-2-2 (4)	I' same as.above. Bottom 6".S SP, medium to coarse, dk. gra soft, interlayered w/silt.	SAND. y. wet,		ess Steel Colorado		Flush
20.0 —	20.0			1-1-2	SILT, ML, dk. gray, wet, firm, fine sand, slightly plastic at ba	15% v. ese.	ML-	Stainle Stainl		. -
1	25.0			1-3-2 (5)	CLAYEY SILT, ML/CL, gray w/ green mottling, wet, soft to me much root debris and vegetati	dium, on.	ML/CL	*		nedule 40—/Secured
25.0 - - -	20.0				1' same as above. Bottom 6";S W/SILT, SP, dk. gray, wet, so medium to fine.	AND	SP_	Backfilled to 23' with 3/4" Volclay Bentonite Chips—	V222	2" Diameter Schedule 40. PVC Silt Trap w/Secured Bottom Plug

Appendix E RMC Production Well and Sampled Offsite Well Geologic and Well Drillers' Logs

STATE ENGINEER MULT Salem, Oregon 001308	Well_Record	STATE WELL NO. 1N/3-23F(1) COUNTY Multnomah APPLICATION NO. GR- 462
OWNER: Reynolds Metals Co.	MAILING ADDRESS: .	Sundial Rd.
LOGATION OF WELL: Owner's No	_	Troutdale, Oregon
SE 14 NW 14 Sec. 23 T. 1 XX, R.	3XV., W.M.	
Bearing and distance from section or subdiv corner N.37°09'W. 2732' from SE cor.		
corner N. 57 05 W. 2/32 II Ull DE CUI	UI Sec. 2)	F(1)
	>	
Altitude at well 26!		
TYPE OF WELL: Drilled Date Constru		
Depth drilled2821 Depth cased .	2821	Section23
FINISH: AQUIFERS:		
WATER LEVEL: 85 feet PUMPING EQUIPMENT: Type	Pamona 7 stage turb	Dine H.P. 50
Capacity	·	
Drawdown ft. after		G.P.M.
		G.P.M.
ADDITIONAL DATA:		
LogX Water Level Measurement	s Chemical An	alysis Aquifer Test

CV:

State Well-No. (N/3-2-3 F/) County Mult. Application No. GR-462

Well Log

Owner: Reynolds Metals Co. Owner's No. #1

Driller:	Date Dr	illed <i>Fe 6. 2</i>	3/12
CHARACTER OF MATERIAL	(Feet bel	ow land surface)	Thickness
White of the second sec	From	То	(feet)
Top soil	0		1
Brown sandy clay	1	4	3
Soft blue silt & clay	4	25	21
Hard silt & sand	25	47	22
Sand with silt, blue	47	142	95
Scattered gravel in same	142	150	&
Sand	150	230	80
Grey sand	230	261	31
Large gravel	261	264	3.
Loose gravel - water	264	268	9
Conglomerate	268	228	10
Sand	278	282	9
er en en en en en en en en en en en en en			
		,	
			<u> </u>
			

STATE ENGINEER Salem, Oregon

MULT Well Record

STATE WELL NO. 1N/3-23G(1)
COUNTY Multinomah
APPLICATION NO. GR-162

OWNER: Reynolds Metals Co.	MAILING ADDRESS:	Sundial Rd.		
LOCATION OF WELL: Owner's No2'	CITY AND STATE:	Troutdale,	Oregon	
SW 1/4 NE 1/4 Sec. 23 T. 1 XXXR 3 XXX				
Bearing and distance from section or subdivision				
corner N. 3749', W. 1950' from SE cor. of se	<u>c. 23</u>	-	G(1)	
			0(2/	-

Altitude at well261				
TYPE OF WELL: Drilled Date Constructed 2/2	3/42			
Depth drilled 268 Depth cased 268		Section	23	
CASING RECORD: 10 inch				
10 Inch				
FINISH:				·
TINISI.				
AQUIFERS:				<u> </u>
WATER LEVEL:				
78 feet				
PUMPING EQUIPMENT: Type Pamona, Capacity 530 G.P.M.	7 stage tur	pine	H.P.	lo .
WELL TESTS: Drawdown22 ft. after	house	 ქე		CDM
Drawdown ft. after				
USE OF WATER Industrial SOURCE OF INFORMATION GR-1415	Temp	·F		19
DRILLER or DIGGERADDITIONAL DATA:	***************************************	*		
LogX Water Level Measurements	Chemical An	alysis	Aquifer Te	st
REMARKS:				

State Well No. 11/2 20676 County Mull. Application No. 68-462

Well Log

Owner: Reynolds Medals Co. Owner's No. #2

Driller:	Date Dril	led <i>Feb.</i> 2.	2142
CHARACTER OF MATERIAL	(Feet below From	r land surface) To	Thickness (feet)
Top soil	0	2	2
Sand- some water	2	16	14
Silt & sand	16	32	16
Coarse sand	32	36	4
Fine sand	36	77	41
Sandwith some gravel	77	87	10
Sand	87	145	58
Sand, some scattered graves	145	157	12
Sand, some wood	157	165	8
Sand	165	181	16
Silt & sand	181	201	20
Coarse gravel with clay binde	201	214	13
Sand & gravel, with water	1	233	19
Blue clay	233	245	12
Gravel with clay binder	245	251	6
Very loose gravel-with water	1	258	7
Praveluith more sand		268	10
	•		
		,	
		-	

STATE ENGINEER Salem, Oregon	MULT	Well R	ecord	STA	TE WELL	VO. IN/	3-23G(2)
, ,	001323	F		APP	LICATION	NO. GR-	×462
OWNER: Reynolds M	~ ~ ~		MAILING ADDRESS: .	Sundial	Rd.		4
LOCATION OF WELL		3	CITY AND STATE:	Troutda	le, Oregon	L	
SW 1/4 NE 1/4 Sec.	23 T. 1 XXXR	3 XXXX, W	7.M.	!		:	
Bearing and distance from	om section or subdi	vision					
corner 3674' N. &	1534' W. from S	SE cor. of	sec.23			p;	
	********************************				G(2)		,
***************************************	,	···					
***************************************	***************************************	***********	******				
Altitude at well 28	.51	********	*****	1			
TYPE OF WELL: Dril	led Date Constr	ucted June	<u> 1</u> 12				
Depth drilled 281'				Secti	ion 23		ı
CASING RECORD:						-	
12 inch							
FINISH:			· · · · · · · · · · · · · · · · · · · 				
AQUIFERS:							
					<u> </u>		
WATER LEVEL: 72 feet					•		
PUMPING EQUIPMEN Capacity750	T: Type Par G.P.M.	nona, 4 sta	ge turbine	9		H.P	40
WELL TESTS:	,					·	
Drawdown13							
Drawdown	ft. after	h	ours	******************			G.P.M.
USE OF WATERI SOURCE OF INFORM DRILLER or DIGGER	ndustrial ATION GR- hbs	<u> </u>	emp		************		
ADDITIONAL DATA: LogX Water							
REMARKS:					**************************************		

State Well No. 1825-2366 County Mult. Application No. GR-462

Well Log

Owner: Reynolds Medals Co. Owner's No. #3

Driller:	Date Dri	lled June	42
CHARACTER OF MATERIAL		w land surface)	Thickness (feet)
,	From	To	
Dredge sand from river	0	ک	5
Coarse sand	_ ک	18	13
Blue silt	18	25	7
Hard sandstone	2.5	70	45
Sand	70	194	124
Cemented gravel	194	197	9
Blue clay	197	229	27
Cemented gravel	224	227	9
Blue olay	227	243	16
Cemented gravel	243	245	2
Sandy gravel	245	248	3
Cemented gravel	248	252	7
Gravel - water bearing	252	261	9
Coarse grey sand	261	273	12
Cemented gravel	273	275	2
Sand	275	277	2
Conglomerate	277	280	٠
Brown clay	280	281	/
·	<u> </u>		

STATE ENGINEER Salem, Oregon OO1328 OWNER: Reynolds Metals Co. LOCATION OF WELL: Owner's No. SE 1/4 NE 1/4 Sec. 23 T. 1 XX, R. 3 XX, W.M. Bearing and distance from section or subdivision corner 35101.N1 & 967' W. from SE cor. sec. 23	STATE WELL NO. 1N/3-23H(1 COUNTY - Multingmah APPLICATION NO. GR- 462 Sundial Rd. Troutdale, Oregon H(1)
Altitude at well 28.5!	
TYPE OF WELL: Drilled Date Constructed 8/3/42 Depth drilled 190' Depth cased 190'	Section 23
CASING RECORD: 12 inch FINISH:	
AQUIFERS:	
WATER LEVEL: 53 feet	
PUMPING EQUIPMENT: Type P. M., 8 stage turbi Capacity 980 G.P.M.	ne H.P75
WELL TESTS: Drawdown 22 ft. after hours	101:0 G.P.M
Drawdown ft. after hours	G.P.M
SOURCE OF INFORMATION GR- 445	PF, 19
LogX Water Level Measurements Chemical Ana	lysis Aquifer Test

State-Well No. W/3 - 23.HM County Mult. Application No. GR-462

Well Log

Owner: Reynolds	Medals Co.	Owner's No.	#4
•			

CATA TAMES VE PT TOTAL	(Feet bel	ow land surface)	Thickness
CHARACTER OF MATERIAL	From	То	(feet)
Derdge sand from viver	0	3	3
Yellow silt	3	12	9
Blue silt	12	25	13
Grer sand	25	159	134
large conglamerat grave	159	164	5
Gravel - water bearing	164	17.5	11
Coarse Sand	175	177	2
bravel with clay binder	177	190	13
	•		
	1		
· · · · · · · · · · · · · · · · · · ·	1		
	<u> </u>		
	_		
	 		

STATE ENGINEER	MULT W	ell Record	STATE WELL	NO. 1N/3-	23H(2)
Salem, Oregon		of the second	APPLICATIO		
OWNER: Reynolds Met:	als 801331	MAILING ADDRESS:		N NO. <u>911- 1</u> 1	02
OWINITE. LANGINGARE INC.		CITY AND	*****************************	*****************************	
LOCATION OF WELL: O		STATE:	Troutdale, Oreg	on	***********
SE 1/4 NE 1/4 Sec. 23	T. 1 XX, R. 3	XV., W.M.			
Bearing and distance from	section or subdivisio	n ,			
corner 3740' N. & 1015	W. from SE cor.	sec. 23		0	
***************************************	******	***************************************	1	H(2)	
***************************************	***************************************	***************************************			
***************************************		*******			
Altitude at well28.	51	************			
TYPE OF WELL: Drilled	1 Date Constructe	d Apr. 1943			
Depth drilled 3301			Section2	3	
CASING RECORD:					
16 inch					
					· ·
FINISH:					
			,		
AQUIFERS:		•			
WATER LEYEL:					
60 feet				,	
	7-			3 5%	
PUMPING EQUIPMENT: Capacity1500	Type G.P.M.	ona, / stage tur	DINE	HP. 150	
WELL TESTS:			9	200	
		hours			G.P.M.
Drawdown	ft. after	hours		***************************************	G.P.M.
USE OF WATERL SOURCE OF INFORMATI	ndustrial	Temp	°F		19

DRILLER or DIGGER ADDITIONAL DATA:	***************************************				
Log X Water Lev	el Measurements	Chemical Ar	nalysis Aq	uifer Test	
REMARKS.					

The same of the sa

Application No. GR-462

Well Log

Well Log

Metal

Owner: Reynolds Medals Co. Owner's No. #

Driller:	Doto De	illed <i>Apri l</i>	143
CHARACTER OF MATERIAL		ow land surface)	Thickness
	From	To	(feet)
Top soil		2	2
Clay, some silt	2	4.5	45
Silt, sand, & clay	45	150	105
Convented large gravel	150	167	17
Loose sand & gravel-water	167	185	18
Some clay in gravel	185	180	5
Gravel with clay binder	190	220	30
Blue clay & sand	220	293	23
Gravel, very fight - may bave water	243	253	10
Gray sand	255	263	10
Clay	263	265	2
Sandfisilt-scattering of gravel	265	285	20
Blue clay	285	300	15
Sandstone	300	330	30
•			
•			

STATE ENGINEER Salem, Oregon		Well Record	COUNTY	VELL NO. 1N/ Mul ATION NO. GR-	tnomah
	001311	MATTING		110N NO. 241	
OWNER: Reynolds Me	etals Co.			*****************************	
LOCATION OF WELL			Troutdale, (regon	***************************************
SE 14 NE 14 Sec. 2	23 T. i N.	3 E. 3 XXX, W.M.			
Bearing and distance fro	m section or subdivis	ion			
corner 3559' N. & 11'	57' W. from SE cor	sec. 23		© H(3)	4

Altitude at well	28.51				
TYPE OF WELL: Dril	Led Date Construct	ted 2/27/48			
Depth drilled 279!			Section	23	
FINISH:					
AQUIFERS:					
WATER LEVEL: 55 feet			·		
PUMPING EQUIPMEN Capacity100	T: TypeF.	. M., 5 stage tur	bine	н.р	60
WELL TESTS: Drawdown	ft. after	hours	***************************************	******************************	G.P.M
Drawdown	ft. after	hours			G.P.M
USE OF WATER SOURCE OF INFORMADRILLER or DIGGER ADDITIONAL DATA:	ATION GR- 1115		*******************************	***************************************	
Log Water 1	Level Measurements .	Chemical A	nalysis	Aquifer Test	

State Well No /// County Mul Application No. GR

Well Log tals ats Co. Owner: Reynolds A

	7	un lond musts ::	
CHARACTER OF MATERIAL	From	w 'and surface) To	Thickness (feet)
Dredge sand from river	0	6	6
Blue silt	6	35	29
Hard blue clay	35	50	15
Sand silt & clay	50	169	119
Blue clay	169	176	/
Cemented gravel	176	193	17
Coarse sand - water	195	200	7
cose sandforavel-water	200	206	6
Sand & clay	206	235	29
Blue clay	235	250	15
Cemented gravel	250	258	8
Sand	258	262	7
Cemented gravel	262	268	E
Loose sand Felay - water	268	277	9
Cemented grave/with	277	279	2
brown clay pinder			
`		,	
,			

STATE ENGINEER Salem, Oregon	MULT We	ell Record		LL NO. <u>IN/3-23H(l</u> Multnomah
· · · · · · · · · · · · · · · · · · ·	661329	· + armigration	APPLICATI	ON NO. <u>GR-</u> <u>462</u>
OWNER: Reynolds Me	•	MAILING ADDRESS:	Sundial Rd.	***************************************
LOCATION OF WELL:			Troutdale, Ore	egon
SE 1/4 NE 1/4 Sec. 2	3 T. 1 XX, R. 3	E. XW., W.M.		1
Bearing and distance from	n section or subdivision			
corner 3404' N. & 947	W. from SE cor. s	ec. 23		H(f1)

**************************************		******************		
Altitude at well2	8,51	***********		
TYPE OF WELL: Drill	ed Date Constructed	5/12/48		
Depth drilled 254*	Depth cased	2541	Section	23
FINISH:				
•				•
AQUIFERS:		•		
WATER LEVEL: 70 feet	•			
PUMPING EQUIPMENT Capacity 1000	: Type F. M G.P.M.	., 5 stage turb	ine	H.P. 60
WELL TESTS: Drawdown	ft. after	hours	***************************************	G.P.M.
Drawdown	ft. after	hours		G.P.M.
SOURCE OF INFORMADRILLER or DIGGER	ndustrial TION GR- 1415		*******************************	, 19
ADDITIONAL DATA: LogX Water L	evel Measurements	Chemical A	nalysis A	.quifer Test
REMARKS:				

Well Log metals Medals Co

Driller:	Date Drill	ed May 12	195
CHARACTER OF MATERIAL	(Feet below From	To To	Thickness (feet)
Dredge sand from river	0	4	4
Blue silt	4	32	28
Blue clay	32	39	
Brown sand	39	156	117
Blue clay	156	170	14
Brown clay	170	176	6
Grey sand	176	184	8
Cemented gravel	184	187	ج
Sticky green clay	187	198	11
Cemented gravel	198	206	8
Coarse sand Small gravel,	206	218	12
white clay binder			
Blue clay	218	226	8
Brown clay	226	236	10
Loose gravel & sand -	236	246	10
water bearing	,		
Sand with Elay binder	246	254	8
<u>.</u>			
•			

STATE ENGINEER Salem, Oregon	MULT W	ell Record	STATE WI	ELL NO. IN	[/3-23H(5]
paiem oreson	- 1000			TON NO. GI	
OWNER: Reynolds Me	001330	MAILING ADDRESS:		,	
A		CITY AND	_		***************************************
LOCATION OF WELL:	Owner's No8	STATE:	Troutdale, Or	egon	
SE 1/4 NE 1/4 Sec. 2	3 T. 1 XX, R. 3	X ., W.M.	!	1	1
Bearing and distance from	section or subdivision	n			Ī
corner 35811 N. & 801	" W. from SE cor.	sec. 23		0	1
***************************************	***************************************	***************		H(5)	
44.ccc.c	, , . **********************************	***************			1
					}
Altitude at well	(1				1
TYPE OF WELL: Drill	ed Date Constructed	9/21/48			
Depth drilled 2481	Depth cased	21:81	Section	23	-
12 inch from	152 to 248 feet				
AQUIFERS:					
WATER LEVEL: 60 feet	·				
PUMPING EQUIPMENT: Capacity1000	TypeF.M GPM.	., 5 stage turb	ine	Н.Р	60
WELL TESTS:	4.				~ D.1.
Drawdown					
Drawdown	ft. after		***************************************		
USE OF WATERINC SOURCE OF INFORMAT DRILLER or DIGGER	ION GR- 445				
ADDITIONAL DATA: LogX Water Le	vel Measurements	Chemical A	nalysis	Aquifer Test	***************
REMARKS:					

County NUTA

Well Log

owner: Reynolds Medals Co Owner's No.

COADA COMPO CONTRACTOR	(Feet below	'and surface)	. Thickness
CHARACTER OF MATERIAL	From	To	(feet)
Dredge sand from river	0	3	3
Blue silt & sand	3	34	31
Blue clay	34	43	۶
Brown silt & sand	43	148	145
cemented gravel	148	151	3
brey sand	151	158	7
ouse sand foravel-some water	158	166	8
Grey sand	1.6.6	192	26
pose sand & gravel-water bearing	192	215	23
emented gravel	215	218	3
Loose sand & gravel	218	235	17
water-bearing			
Sand & Silt	235	248	13
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STATE ENGINEER Salem, Oregon	MULT	Well	Record	COU	VTY	D. 1N/3-23G(3 Multnomah O. GR- 462
Pormol da M	001324		MAILING			O. <u>an- noz</u>
OWNER: Reynolds M			_ ADDRESS: CITY AND		ra.	
LOCATION OF WELL			STATE:	Troutdal	e, Oregon	
SW 1/4 NE 1/4 Sec.	23 T. 1 X, B	23. X	, W.M.			
Bearing and distance from	om section or subdi	vision		i		
corner 3459' N. &	1744' W. from	SE cor.	sec. 23		G(3)	
***************************************		4 a 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	***********			
Altitude at well2	8.51		************			
TYPE OF WELL: Dril	led Date Constr	ucted7/2	23/49			
Depth drilled295!	Depth cased	29	<u> </u>	Section	on23	
FINISH:						
				·		
AQUIFERS:						
WATER LEVEL: 105 feet	·					
PUMPING EQUIPMEN Capacity 1200	T: Type	Peerless	, 2 stage i	turbine	I	I.P. 40
WELL TESTS: Drawdown	ft. after		hours	**************************	***************************************	G.P.M
Drawdown	ft. after		hours	***************************************		G.P.M
SOURCE OF INFORMADRILLER or DIGGER	ATION GR- 445				***********	
ADDITIONAL DATA: Log Water	Level Measuremen	ts	Chemical A	nalysis	Aquife	r Test
REMARKS:						

After development of well at 295' silt condition could not be remedied. Well was back filled to 180' before pump test.

State Wall No ///
County // //
Application No. 5 /

Well Log

Owner: Reynolds Feders Co. Owners No.

	i da karang karana		
Driller:	Date Dri	lled VV/y 29	49
	(Feet below	w 'and surface)	A DESCRIPTION OF THE PARTY
CHARACTER OF MATERIAL	From	70	(feet)
	,	The state of the s	· 一种
Dredge sand from river	0	6	6
		400000000000000000000000000000000000000	
Brown sandy clay	6	33	27
	1	The same of the sa	
Blue clay, sandy	33	3.9	# 6
			The second state of
Fine gray sand, packed	39	155	116
		170	2.94
Gray sand, water-bearing	155	179	1604 322500 cm
Gray packed sand	170	191	17
Gray packed sand	179	197	2002 200
Gray Silt	191	226	32
			130000000000000000000000000000000000000
Sticky blue clay	226	250	24
	Sight and the second	《大学》	APPROXIMATION TO
Cemented gravel, gray	250	276	22.6 f
		- THE PARTY OF THE	100
binder	276		A STATE OF THE STATE OF
Heavy brown sand, water-	276	273	
the state of the s	· · · · · · · · · · · · · · · · · · ·		
bearing	· ·	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	72. C. C. C. C. C. C. C. C. C. C. C. C. C.
Loose sand & gravel	278	288	10
		24.20.40	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Cemented sand & gravel	288	293	5
		26.92	ा लाउना में अने देशा हुने
Brown clay	293	295	2
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MULT Well Record

COUNTY Multnomah APPLICATION NO GR-462

OWNER: Reynolds Metals Co.	MAILING ADDRESS: .	Sundial Ro	•	The second
	CITY AND STATE:	Troutdale,	Oregon	\$ 100 miles (100 miles
SW 1/4 NE 1/4 Sec. 23 T. 1 S, R. 3 W				
Bearing and distance from section or subdivision				
corner 3198' N. & 1754' W. from SE cor. sec.	23		G(H)	
	•		-	
	,			
Altitude at well 28.51				
TYPE OF WELL: Drilled Date Constructed 8/	17/49			
Depth drilled 625t Depth cased 625		Section	23	****
CASING RECORD: 20 inch from 0 to 140 feet 12 inch from 0 to 625 feet				
•				
FINISH:				
Perforated from 114 to 185 feet -	shut off whe	n well was	redrille	d to 6251
14 °	,			,
AQUIFERS:	,			
WATER LEVEL:				
78 feet (1955)				
Peoples	2 stone to	mhi no	71	I.P60
PUMPING EQUIPMENT: Type Peerless Capacity G.P.M.	3. J. 5. 005 E		E	I.P
WELL TESTS: Drawdown 40 ft after	•	•	000	
2444COM1				G.P.M.
Drawdown 48 ft. after				
USE OF WATER Industrial SOURCE OF INFORMATION GR-1415	Temp	°F		19
ADDITIONAL DATA:				
LogX Water Level Measurements	Chemicai An	atysis	Admie	r Test
AMINITAL ALVIDIO				

State Well No. (N/) -2266 County Mult. Application No. GR-462

	Metals	•		
Owner: Reynolds	Modals	Cor	Owner's No.	#10

Driller:	Date Dri	lled Aug. 1	7.49
CHARACTER OF MATERIAL	(Feet belo	w 'and surface) To	Thickness (feet)
Dredge sand from river	0	6	6
Brown sand	6	16	10
Blue clay	16	19	3
Brown sand	19	42	23
Gray sandy clay	92	62	20
Cemented gravel, gray binde	62	81	19
Gray silt & sand-water		144	63
bearing			,
Gray sand-water bearing	144	165	21
Cemented gravel	1650	168	3
Gray sand-water bearing	168	186	18
Gray silt	186	190	4
Blue sandy silt	190	206	16
Hard packed sand	206	227	21
Sandy silt	227	238	11
Coarse sand & gravel	238	294	6
Blue clay	244	252	8
Hard packed sand-some	252	337	85
gravel			,
Sandy silt & gravel	337	342	5
Hard packed sand	342	372	30
Sandy clay	372	377	5
Hard packed sand forave	1377	385	8
Sandy clay	385	392	1

State Well No.	W-3 256
County Mul	1.
Application No.	

Owner: Rey holds Metals Co- Owner's No.	#10
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Driller:	Date Dri	led	***************************************
CHARACTER OF MATERIAL	(Feet below	w 'and surface) To	Thickness (feet)
Sandy silt	392	401	9
Packed sand	401	416	15
Blue clay	4/6	421	5
Packed sand	421	432	11
Sandy clay & gravel	432	461	29
cemented gravel	461	472	11
Sand & gravel-water bearing	472	482	10
Cemented gravel	482	513	31
Dirty sand & grarel, small	5/3	520	7
Sand, gravel - water	520	532	12
Blue silt	532	539	7
Sand, gravel - water	539	559	20
Silt with small amount	559	570	11
grarel			
Blue clay	570	587	17
Hard shale	587	625	38
		_	
		•	

Salem, Oregon	001325	- 121.0	COUNTY APPLICA	ATION NO.	19/3-23G(5 Multnomah GR- 462
OWNER: Reynolds Me	etals Co.	MAILING ADDRESS:	Sundial Rd		
LOCATION OF WELL:	Owner's No11	CITY AND STATE:	Troutdale.	Oregon	
SW 1/4 NE 1/4 Sec. 2	23 T. 1 X, R. 3	E. W ., W.M.			7
Bearing and distance from	n section or subdivision	•			
corner 3246' N. & 147	Դև W. from SE cor.	- •		G(5)	
•		•			-
Altitude at well 28.5	(1				-
TYPE OF WELL: Drill	ed Date Constructed	8/17/49			
Depth drilled5921	Depth cased	<u>5h1'</u>	Section	23	
FINISH: Perforated:	from 147 to 187 fee	t - shut off who	en well was r		5921 /16/55)
AQUIFERS:					
WATER LEVEL: 45 feet					
PUMPING EQUIPMENT Capacity 1180	: Type <u>Peerless</u> , G.P.M.	3 stage turbi	3e	H.P	60
WELL TESTS: Drawdown	ft. after	house	•	L000	G.P.M.
	ft. after			L200	G.P.M.
USE OF WATER Ind SOURCE OF INFORMAT DRILLER OF DIGGER	lustrial FION <u>GR- 145</u>	Temp	°F		
ADDITIONAL DATA: LogX Water Le	evel Measurements		•	•	t
PEMARKS.				· -	

State Well-No County Co

Well Log

Owner: Reynolds Medals Co. Owner's No. #

Driller:	Date Dril	led Avg. 17	149
CHARACTER OF MATERIAL		v land surface)	Thickness (feet)
	From	16	(tees , as
Dredge sand from river	0	8	8
Sandy clay	8	19	6
Brown clay	14	32	18
Brown silt	32	68	36
Brown sift Every fine gray	68	143	75
sand			
Hard brown silty clay	143	152	9
Gray sand & small gravel	152	167	15
water bearing			
Gray sand Comented graves	1167	171	9:
Gray sand - water bearing		178	7
Cemented gravel	178	183	5
Cray silt	183	188	5
Blue "	188	202	14
Gravel sandy clay binder	202	207	5
Sandy clay	207	219	12
Hard packed sand	219	232	13
Sandy silt	232	239	7
Hard packed sand -	239	274	35
small amount gravel	•		
Sandy silt.	274	286	12
Hard packed sand some grave	286	307	21
	307	362	255
Black shale	362	385	3

Application No.

Well Log
Owner: Reynolds Modals Co.
Driller: . Owner's No.

CHARACTER OF MATERIAL	(Feet belo	w 'and surface' To	Thickness (feet)
Sandy clay	365	383	18
Sandf small amount of	383	407	24
gravel with clay birider		<u> </u>	
cemented gravel	407	416	9
Sand & gravel-water bearing	4/6	447	31
Fine sand	447	485	38
Tight gravel	485	488	13
Sand & gravel, chy binder	498	507	9
Sand with some gravel	507	520	13
water			.;
Sand & gravel-clay binde	520	533	13
cemented gravel	533	561	28
Shale	561	592	31
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	1	1	}

MULT Well Record 001319

ord STATE WELL NO 11/32316
COUNTY MULTNOWAY APPLICATION NO.

OWNER: Reynolds Metals Co.	MAILING ADDRESS:		
LOCATION OF WELL: Owner's No. #12	CITY AND STATE:		
N. S., R. Bearing and distance from section or subdivision	E. W., W.M.		
corner			
Altitude at well28			
TYPE OF WELL: Dribled Date Constructed		Section	
CASING RECORD: 20-12 inch			
FINISH:			
AQUIFERS: Sand, Gravel, Troutdale Sand, Troutdale Formati Sand, Gravel, Troutdale	ion, from 230 to 2	34	
WATER LEVEL: 23 feet below land suri	face, September, 1	949	•
PUMPING EQUIPMENT: Type Turn Capacity 1,200 G.P.M.	bine		I.P.
WELL TESTS: Drawdown ft. after	hours	************************************	G.P.M
Drawdown ft. after	hours		G.P.M
SOURCE OF INFORMATION USGS DRILLER or DIGGER	Temp °F		
ADDITIONAL DATA: Log X Water Level Measurements REMARKS:	Chemical Analysi	isX Aquife	r Test

Perforated 512-518, 522-538, 544-555, and 563-578 feet.

State Well No. 1N/S-23Kl
County MULTNOMAH
Application No.

Owner: Reynolds Metals Co.	Owner's No. Pω12			
Driller: R. J. Strasser Drilling Co.	Date Drilled 1949 and 1954			
CHARACTER OF MATERIAL	(Feet below lan	d surface) To	Thickness (feet)	
Artificial fill and younger alluvium:				
Fill and soil	о	24	24_	
Younger alluvium:				
Silt and clay	24	42	18	
Sand, brown	42	54	12	
Sand, fine, gray	54	143	89	
Sand, coarse, gray, some clay	143	156	13	
Troutdale Formation:				
Sand, coarse, some gravel, water-bearing	156	187	· 3 <u>1</u>	
Sand and clay, gray	187	230	43_	
Sand, in part water-bearing	230	234	44	
Sand and clay, blue	234	265	31	
Shale, blue	265	281	1.6	
Clay and sand	281	305	24	
Sand, fine with scattered gravel	305	352	47	
Sand and clay, gray	352	361	9	
Shale and sand, black	361	384	23	
Clay, brown	384	396	12	
Sandstone	396	409	13_	
Sand and clay, with some gravel	409	420]1	
Sand, hard-packed, with some clay	420	1446	26	
Clay and gravel	1446	474	28	
Clay, sandy	474	487	13_	
Sandstone	487	507	20	

All the rest of the second	The second	المدركا
State Well No.		1.2
County	The state of the s	سرن به مامارس مامارس
Application No.		3.7

Owner: Reynolds Metals Co.		O	wner's No.	با 2 إلى ا
	,	Date Drille	i	
CHARACTER OF MATERIAL		(Feet below !s		Thickness (feet)
		From	To	(1661)
Sand and gravel, loose, water-beari	.ng	507	577	70
Gravel. cemented		577	597	20
Sand and silt		597	606	9
Clay, blue, hard		606	615	9
·			-	
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STATE ENGINEER Salem, Oregon	MULT 001326	Well Reco	ord	COUNT	WELL NO	-Mul	tnomah
OWNER: Reynolds M	etals Co.	MAII ADDI	ING RESS: _S	undial Rd.)		
LOCATION OF WELL	: Owner's No	12 CITY STAT	AND T	routdale,	Oregon	************	~~~~
SW 1/4 NE 1/4 Sec.	23 T. 1 XX, I	E. 3 XV., W.M.	• [-	i		
Bearing and distance fro			.	! !			,
corner 2944 N. & 17	19 W. from SE	cor. sec. 23		1 1 1	G(6)		

Altitude at well2	8.51						
TYPE OF WELL: Dril		ructed 9/13/49					
Depth drilled 616'				Section	23		
FINISH: Perforated to 616 fe	eet. Hole backf	7 feet - shut of illed with grav					
AQUIFERS:			<u> </u>				
WATER LEVEL: 39 feet			,				
PUMPING EQUIPMEN Capacity 1180	T: Type G.P.M.	Peerless, 3 st	age turbi	ne	Н.	P60)
WELL TESTS: Drawdown7	L ft after	hours .		10	00		. G.P.M.
Drawdown80	<u> </u>	hours .			~~		G.P.M.
USE OF WATER LISOURCE OF INFORMATION OF DIGGER	ndustrial ATION GR- Щ	Temp		**************			•
ADDITIONAL DATA: Log X Water I	Level Measuremen	ts Chemi	cal Analys	is	'Aquifer	Test	
REMARKS:							

State Well Vio. DZ.

Well Log

Owner: Reynolds Models Co. Owner's No. 3772

COTATA A COMMON COMMON A STATE OF THE STATE	(Feet below	and surface)	Thickness
CHARACTER OF MATERIAL	From	To	(feet)
Dredge sand from pirer	0	-5	.5
Fine brown silt	5	19	14 "
Blue silt	19	26	7
Brown clay	26	37	11
Hard blue clay	37	42	5
Brown sand	42	54	-12
Fine gray sand	54	143	89
Coarse gray sand, some hinde	143	156	13
Coarse sand & small	156	187	31
gravel-water bearing		. "	3 %
Grey sand with gray clay	187	230	45
binder			
Sand - some water	230	234	4
Sand & blue clay	234	246	12
Fine gray sand	246	259	13
Blue clay & Sand	259	265	6
Heavy blue shale	265	28/	16
Blue clay & sand	281	305	24
Fine sand-scattered	305	352	47
gravel			
Gray sand & clay	352	361	9
Black shale & sand	361	384	23
Brown clay	384	396	12
	396	 	1

State Well No. /// County : My//:
Application No. G/1862

Owner Reynold	Medals	Co Owner's No.	41/2
D -/11		TO 1 TO 177. 7	A

Sand f clay 409 418 9 Blue play f gravel 418 421 3 Hard packed sand \$ 421 426 5 clay Hurd packed sand 426 447 2 Clay f gravel 447 475 29 Sandy clay 475 488 13 Et sand shine 488 508 20 Sand f gravel, bose - 508 558 5 Water bearing Blue clay 558 560 2 Loose sand f gravel 578 598 20 Cemented gravel 578 598 20 Fine blue sand f sitt-water 598 607	Driller:	Date Dri			
Sand & clay 409 418 9 Blue clay & gravel 418 421 3 Hard packed sand & 421 426 5 clay Hurd packed sand 426 447 2, Clay & gravel 447 475 29 Sandy clay 475 488 13 Et sand shine 488 508 20 Sand & gravel, bose - 508 558 50 Water bearing 558 560 2 Loose sand & gravel 578 598 20 Some water 578 598 20 Fine blue sand & sitt-water 598 607 10	CERTAL ACTION OF MATERIAL.	(Feet below	w land surface)	Thickness	
Blue clay figravel 418 421 3 Hard packed sand f 421 426 5 clay Hurd packed sand 426 447 2, Clay figravel 447 475 29 Sandy clay 475 488 13 St sand shine 488 508 20 Sand figravel, bose - 508 558 50 Water bearing Blue clay 558 560 2 Loose sand figravel 560 528 12 Some water Cemented gravel 578 598 20 Fine blue sand fight-avalue 598 607	COMPACIAL OF MATERIAL	From	To	(feet)	
Blue clay figraved 418 421 3 Hard packed sand f 421 426 5 clay Hurd packed sand 426 447 2, Clay figravel 447 475 29 Sandy clay 475 988 13 Et sand stone 488 508 20 Sand figravel, bose - 508 558 50 Water bearing Blue clay 558 560 2 Loose sand figravel 560 528 18 Some water Cemented gravel 578 598 2 Fine blue sand fight-water 598 607	Sand F clay	409	4/8	9	
Hard packed sand \$ 421 426 5 clay Hurd packed sand 426 447 2, Clay & gravel 447 475 29 Sandy clay 475 988 13 Et sand shine 488 508 20 Sand & gravel, bose - 508 558 5 Water bearing 558 560 2 Loose sand & gravel 560 528 12 Some water Cemented gravel 578 598 2 Fine blue sand & sitt-water 598 607		418	421	3	
Hurd packed sand 426 447 2, Clay & gravel 447 475 28 Sandy clay 475 488 13 St sand & gravel, hose - 508 558 560 2 Some water Gravel - 560 528 18 Some water Gravel - 578 598 2 Some water Gravel - 578 598 2 Some water Gravel - 578 598 2 Some water Gravel - 578 598 2 Some water Gravel 578 598 2 Some water Gravel 578 598 2 Some water Gravel 578 598 2 Some water Gravel 578 598 2 Some water 598 607		421	426	5	
Clay & gravel 447 475 29 Sandy Clay 475 488 13 St sand stone 488 508 20 Sand & gravel, bose - 508 558 50 Water bearing 558 560 3 Loose sand & gravel 560 528 12 Some water Cemented gravel 578 598 20 Fine blue sand & sitt-water 598 607					
Sandy clay \$\frac{475}{5and \sigma} \frac{488}{13} \$\frac{5}{5and \sigma} \frac{488}{508} \frac{508}{20} Sand \sigma \frac{9}{9} \tangle \frac{508}{508} \frac{558}{508} \frac{558}{508} Water beaming \$\frac{558}{560} \frac{5}{2} \$\loose \sand \sigma \text{grave} - \frac{560}{560} \frac{528}{58} \frac{12}{560} Some water Cemented \qua	Hurd packed sand	426	447	2/	
Sand fore 488 508 208 Sand foravel, bose - 508 558 508 4 Sand for sand for gravel - 560 528 18 Some water Gravel 578 598 20 Sine blue sand faith-water 598 607 18 Sine blue sand faith-water 598 607	Clay & gravel	447	475	28	
Sand & gravel, hose - 508 558 50 Water bearing Blue clay 558 560 = Loose sand & gravel - 560 528 18 Some water Cemented gravel 578 598 20 Tine blue sand & sitt-water 598 607	Sandy clay	475	488	13	
Water beamny Blue clay 558 560 Coose sand & gravel- 560 528 18 Some water Cemented gravel 578 598 20 Tine blue sand & sitt-water 598 607	st sandstone	788	508	20	
Blue clay 558 560 = 1005e sand & gravel-560 528 12 some water Cemented gravel 578 598 20 Fine blue sand & sitt-water 598 607	Sand & gravel, bose -	508	558	50	
Blue clay 558 560 = 1005e sand & gravel-560 528 12 some water Cemented gravel 578 598 20 Fine blue sand & sitt-water 598 607	water bearing	<u> </u>			
Loose sand & gravel- 560 528 12 some water Cemented gravel 578 598 2 Fine blue sand faith-water 598 607	_ ^ ^	558	560		
Cemented gravel 578 598 2. Fine blue sandfull-water 598 607	_	560	528	18	
Fine blue sand fift-water 598 607	some water				
	Cemented gravel	578	598	20	
Blue clay-Hard 607 616 9		598	607		
	Blue clay-Hard	607	616	9	
		1			
	·	,	·		

STATE ENGINEER MULT Well Record	STATE WELL NO	<u>ln/3-23G(</u>
001327	APPLICATION NO	
OWNER: Reynolds Metals Co. MAILING ADDRESS:	Sundial Rd.	
LOCATION OF WELL: Owner's No. 13 CITY AND STATE:	Troutdale, Oregon	****
SW 1/4 NE 1/4 Sec. 23 T. 1 XX, R. 3 XW., W.M.		
Bearing and distance from section or subdivision		
corner 2839' N. & 1534' W. from SE cor. sec. 23	G(7)	
,	0	
\		
Altitude at well 28.51		
TYPE OF WELL: Drilled Date Constructed 9/9/47		
Depth drilled 1951 Depth cased 1951	Section 23	-
CASING RECORD: 20 inch from 0 to 140 feet 12 inch from 127 to 195 feet		
FINISH:		
AQUIFERS:		
WATER LEVEL: 105 feet		
PUMPING EQUIPMENT: Type Peerless turbine Capacity 1200 G.P.M.	H.	P. 10
WELL TESTS: Drawdown ft. after hours		G.P.N

Drawdown ____ ft. after ____ hours ____ G.P.N

USE OF WATER Industrial Temp. °F. 19
SOURCE OF INFORMATION GR- 115 DRILLER or DIGGER

USE OF WATER Industrial

ADDITIONAL DATA:

REMARKS:

State Well No. // 3c 2c County // // Application No. GR-M4 2

• .			Tittale		•	•
	D	. //	Marie	مر		46 14
Owner: 1	Tey na	Ids	Tiedals	UO:	Owner's No.	77/3

Driller:	Date Dril	led 5ept.	9, 147
	(Feet below	land surface)	Thickness
CHARACTER OF MATERIAL	From	To	(feet)
Dredge sand from river	0	4	4
Brown sandy cky	4	16	12
Blue clay	1.6	20	4
Soft brown sandy clay	20	36	16
Hard brown clay	36	49	13
Fine grey sand	49	140	9/
Coarse Gray sand gray	140	150	18
clay binder			
Coarse sand, small grave	1150	188	38
water bearing formation			<u> </u>
Comented gray sand	188	195	7
,			
		,	
			<u> </u>

STATE ENGINEER Salem, Oregon	MULT	Well_R	lecord	COUNT	WELL NO	Multnomah
OWNER: Reynolds Me	001310		MAILING ADDRESS: .	APPLIC Sundial Rd	CATION NO.	GR- 462
			ADDRESS: . CITY AND		· · · · · · · · · · · · · · · · · · ·	
LOCATION OF WELL:		14	STATE:	Troutdale,	Oregon	********************
SW 1/4 NE 1/4 Sec. 2	3 T. 1 XX, F	₹ <u>3</u> xx , v	W.M.			
Bearing and distance from						
corner 2839' N. & 133	4' W. from SE	cor. sec.	23		G(8)	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	***************************************		*		d	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		·····	,			
Altitude at well28.	51 ,				·	
TYPE OF WELL: Drill				<u> </u>		
Depth drilled 6441	Depth cased	644		Section	23	
	m O to llll fee m O to 6111 fee					
FINISH: Perforated	from 150 to 18	9 feet - s	hut off who	en well was		to 644 feet (7/20/55)
AQUIFERS:						
WATER LEVEL: 49 feet	·			٠		
PUMPING EQUIPMENT Capacity 1180	T: Type	Peerless	turbine		H.P.	60
WELL TESTS: Drawdown 100	ft. after		nours		1050	G.P.M
Drawdown	ft. after	t	ours	######################################	***************************************	G.P.M
SOURCE OF INFORMA DRILLER or DIGGER)			***************************************	, 19
ADDITIONAL DATA: Log X Water L	evel Measuremer	ıts	Chemical An	alysis	Aquifer T	est
REMARKS:						

State Well No. 14/1-250() County MultiApplication No. 6-8-462

Driller:	Date Dril	led Sept.	2914
CHARACTER OF MATERIAL	· (Feet below From	r 'and surface) To	Thickness (feet)
Dredge sand from river	0		5
Brown silt	5	16	11
Brown clay	16	24	8.
Runny blue silt	24	35	11
Sticky blue clay	35	42	7
Fine gray sand	42	96	54
Cemented sand + gravel, han	196	118	22
Hard blue clay	118	129	6
Fine gray sand-gray clay	124	146	22
binder			
Coarse black sand	146	152	6
Coarse sand, Time gravel-	152	184	32
water bearing formation			
Fine sand- gray clay binder	184	191	7
Gray sist	191	194	3
Sandy silt	194	2/5	2/
Packed saud	215	229	9
5; /F	224	233	9
5and tolay	233	239	6
Cemented gravel	239	247	8
Sand & gravel w/ some clay	[287	40.
binder			
Packed sand	287	307	20
Gravel & sandy clay	307	332	25

State Well No. 1/1/276/3
County 1/6
Application No. 6/2-462

owner: Key nolds Metals Co.	(Owner's No.	14
Oriller:	Date Drill	ed	
CHARACTER OF MATERIAL	(Feet below	'and surface)	Thickness (feet)
Hard packed sand	332	339	フ
Sand, some clay & gravel	į.	360	2/
Sand, clay	360	371	11
Dirty sand, small amount	371	487	116
of grave	===		
Cemented gravel	487	495	8
Sand & gravel	495	558	43
Cemented "	538	543	5
Plack sand stone	543	55/	8
emented gravel	551	588	37
stavel of sand sitt	588	600	12
and & gravel up water	600	638	3 8
Dirty sand	638	649	G
			Í
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<u> </u>			
· · · · · · · · · · · · · · · · · · ·			
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STATE ENGINEER Salem, Oregon	MULT	Well	Record		COUNTY	TION NO. GI	11tnomah-
	001312		MAILING				
OWNER: Reynolds M	etals Co.	************	ADDRES	s: Sund	ial Rd.		
LOCATION OF WELL				TD .	tdale, (**********
SE 1/4 NE 1/4 Sec.	23 T. 1 XX, R	3xx.,	W.M.		!	į	
Bearing and distance fro	om section or subdiv	vision			i		
corner 296h! N. & 65	4' W. from SE c	or. sec.	23			H(6) ⊛	

Altitude at well28	,51	.*********	*******		1		
TYPE OF WELL: Dril	led Date Constr	ucted 4/3	0/53				
Depth drilled 275				\$	Section	23	_
	om 0 to 242 feet om 225 to 275 fe		,				
FINISH:							
AQUIFERS:		<u> </u>					
WATER LEVEL: 41 feet					,		
PUMPING EQUIPMEN Capacity1200	T: TypeF.M.	. Pamona	turbine	,	*************	н.р	75
WELL TESTS: Drawdown5	1 ft. after		hours		1350)	G.P.M.
Drawdown	ft. after	100000000000000000000000000000000000000	hours	***************	***************************************		G.P.M.
USE OF WATERIN SOURCE OF INFORMA DRILLER or DIGGER							
ADDITIONAL DATA: LogX Water 1	Level Measurement	S	. Chemical	Analysis .	***************************************	. Aquifer Test	***************************************
REMARKS:							

State Well No. 11/3=2514 County Mult Application No. 617-462

Owner: Heynolds Metals C		Owner's No.	
Driller:	Date Drill	ed April.	30,153
CHARACTER OF MATERIAL	(Feet below From	'and surface) To	Thickness (feet)
Dredge sand from river	o ·	5	5
Sandy clay	5	16	_//
Hard packed sand	16	45	29
Silt	45	58	13
Hard packed sand	58	フフ	19
Sandy silt	77	81	4
Very hard packed sand	8/	132	51
Sand & some small gravel	i i	172	40
Silt & sand	172	208	36
Hard sand like sandstone	208	211	3
Hard sand like sandstone	211	219	8
Gravel uf clay binder	219	228	9
Sand & clay	228	240	12
Cemented gravel & boulders	240	256	16
Sand w/ water	256	260	4
Grave / w/ some water	260	272	12
Tight gravel	272	275	3
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		·	
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The original and first copy— of this report are to be filed with the STATE OF OREGON STATE ENGINEER, SALEM, OREGON 57510 ENGINEER Please type or print) ON 1313 State Well No. 1018-23				
within 30 days from the date OREGON or write a of well completion.	pe or print) 101020 above this line) State Permit No G-3761	<u> </u>	345	3
(1, OWNER: Name REYNOLDS METALS CO	(11) LOCATION OF WELL: County MULT, Driller's well nu	mber	420	60
Address TROUTDALE, ORE, NO. 16	1.5E 1 5E 1 Section 23 T. /N	/ R. 3	BE	W.M.
(2) TYPE OF WORK (check):	Bearing and distance from section or subdivision	corner		
New Well Deepening □ Reconditioning □ Abandon □				
If abandonment, describe material and procedure in Item 12.				
(3) TYPE OF WELL: (4) PROPOSED USE (check): Rotary Driven Demertie Industrial Municipal II	(12) WELL LOG: Diameter of well b	elow casi	ED 3	70 79
Cable D Jetted D Domestic Industrial Municipal Dug Bored D Irrigation Test Well Other	Depth drilled 303 ft. Depth of comple	ted well	2	79 st.
CASING INSTALLED: Threaded Welded X	Formation: Describe color, texture, grain size a and show thickness and nature of each stratus with at least one entry for each change of form in position of Static Water Level as drilling pro	m and aq ation. Re	uifer per port each	netrated, n change
16 " Diam. from 0 tt. to 21 tt. Gage 315	MATERIAL	From	To	SWL
	TOP 301L	0	2	
PERFORATIONS: Perforated? [] Yes No.	GREY SAND	2	6	
Type of perforator used	BROWN SAND	ج_	13	
Size of perforations in. by in.	GREY SILT	13	52	
perforations from ft. to ft.	MUPRY SAND	52	79	
perforations from ft. to ft.	PACKED SAND	79	102	
perforations from ft. to ft.	GREY SAND SOME GRAVE	107	147	
perforations from	WATER BEARING SAND	147	191	
perforations from ft. to ft.	(SOME GRAVEL)		-	
(SCREENS: Well screen installed? Yes No	FINE SAND AND SILT	191	253	
Manufacturer's Name JOHNSON	SAND SIZT AND GRAVES	253	269	
Type STAINLESS STEELModel No. 15 SLOT	SAND AND SILT	278	290	
Diam. 12 Slot size 15 Set from 151 tt. to 192 tt. Diam. 12 Slot size 15 Set from 250 tt. to 269 tt.	SAND, SILT, SOME GRAVE	790	303	
(8) WATER LEVEL: Completed well.				
of the level /6 ft. below land surface Date /0/27/67				
A. cesian pressure lbs. per square inch Date	. ,			
(9) WELL TESTS: Drawdown is amount water level is lowered below static level				
Was a pump test made? Wes No If yes, by whom? STRASSER				
4: 545 gal./min. with H ft. drawdown after I hrs.	Work started SEPT 5 19 6 Complete	ed N	20 Z	- 19 6 7
870 16 1 1	Date well drilling machine moved off of well	NOV		1967
· 1080 · 21 · 12 ·	Drilling Machine Operator's Certification:		• •	
Bailer test gal./min. with ft. drawdown after hrs.	This well was constructed under my di rials used and information reported above			
irtesian flow g.p.m. Date	knowledge and belief	Date 1	10.0	8 11
emperature of water 5# Was a chemical analysis made? Yes No	[Signed] (Drilling Machine Spenter)	Date .M.	CV Z	Q 19 <u>9.</u> /
10) CONSTRUCTION: Vell seal—Material used CEMENT GROWT	Drilling Machine Operator's License No	54		
-1	Water Well Contractor's Certification:			
epth of sealft.	This well was drilled under my jurisdi	ction an	d this r	eport is .
Vere any loose strata cemented off? 🗆 Yes 🗶 No Depth	true to the best of my knowledge and belie	ef.	- /	
drive shoe used? X Yes 🔲 No	NAME KJ STRASSET DE! (Person, firm or corporation)	(Type	or print)	2
ilio any strata contain unusable water? Yes No	Address 8/10SE SUNSET LANK			
ype of water? depth of strata	P1.1.4 1+	······································	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
lethod of sealing strata off	[Signed] bolen a. Ahr	assi	V	
'as well gravel packed? Yes No Size of gravel:	(Water Well Contract	Nov	28	17
ravel placed from ft. to ft.	Contractor's License No Date	NOV	-0	19.

WELL LOG, WELL #16

Well Log: Backfilled to 279 ft. Depth drilled 303 ft. Depth of completed well 279 ft.

<u>Material</u>	From	To
Top Soil	0	2
Grey Sand	2	6
Brown Sand	6	13
Blue Silt	13	17
Grey Silt	17	52
Muddy Sand	52	79
Packed Sand	79	102
Grey Sand, Some Gravel	102	147
Water Bearing Sand (some gravel)	147	191
Fine Sand and Silt	191	253
Sand, Silt and Gravel	253	269
Silty Clay	269	278
Sand and Silt	278	290
Sand, Silt, Some Gravel	290	303

Work started Sept. 5, 1967. Completed Nov. 2, 1967. Date well drilling machine moved off of well, Nov. 3, 1967.

Johnson screens, stainless steel, 15 slot. 12" dia. 15 slots set from 151' to 192'. 12" dia. 15 slots set from 256' to 269'.

	LL REPORT MULT OREGON 00131 State Well No. 11/3-2500
STATE ENGINEER, SALEM, OBEGON STATE OF STATE OF Within 30 days from the filter of well completion.	pe or print) above this line) State Permit No.
(1) OWNER: STALEM. Name REYNOLDS METALS CO	(11) LOCATION OF WELL: County MULT Driller's well number 532/
Address IROUTDALE, DRE, NO. 17	NE & SW4 Section 23 T. /N R. 3E W.M.
Address /ROUTDILE, MEE: MO. 1	Bearing and distance from section or subdivision corner
(2) TYPE OF WORK (check):	Bearing and distance from section of subdivision corner
New Well Deepening . Reconditioning . Abandon . If abandonment, describe material and procedure in Item 12.	
(3) TYPE OF WELL: (4) PROPOSED USE (check):	
Rotary D. Driven D. Pomertie D. Industrial D. Municipal D.	(12) WELL LOG: Diameter of well below casing
Cable M. Jetted Doubester Industrial M. Anthrope Dug Bored Irrigation Test Well Other	Depth drilled 3/0 ft. Depth of completed well 3/0 ft.
CASING INSTALLED: Threaded Welded W	Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.
1) " Diam. from 0 ft. to 170 ft. Gage .330	MATERIAL From To SWL
Diam. from 3.3 ft. to 3.5 ft. Gage 3.50	BROWN SAND 0 22
PERFORATIONS: Perforated? Yes No.	FINE BLUE AND GREY SAND 22 43
Type of perforator used	LIGHT GREY SAND 43 61
Size of perforations in. by in.	HARD PACKED GIREY SAND 61 64 GREY SAND AND CLAY 64 13
perforations from ft. to ft.	HARD PACKED GREY SAND 73 94
perforations from ft. to ft.	BLUE SAND 94 106
perforations from ft. to ft.	PACKED GREY SAND 106 148
perforations from ft. to ft.	GREY AND BROWN SAND 148 160
perforations from ft. to ft.	WATER BEARING SAND 160 168
(7) SCREENS: Well screen installed? XYes \ \ No	WATER BEARNY SANO
Manufacturer's Name U.O.P JOHNSON	AND FINE GRAVEL 168 231
Type STAINLESS, STEEL Model No.	SAND, SIME GRAVEL 231 240
Diam. Slot size Set from 2 1t. to 238 ft.	WAREL BEALING SAMO.
Diam. 12 Slot size 14 Set from 250 ft. to 300 ft.	SMALL AMOUNT OF GRANGE 280 310
(8) WATER LEVEL: Completed well.	Supple Fillings of Granes Fige Sig
Static level 20 ft. below land surface Date 8/26/69	
sian pressure lbs. per square inch Date	
lowered below static level	
Was a pump test made? Yes No If yes, by whom? STRASSER	Work started 111415 241969 Completed A116 39 1969
Kield: 1090 Val./min. with 25 ft. drawdown after 12 hrs.	
	Date well drilling machine moved off of well SEPT 3 1969
	Drilling Machine Operator's Certification:
Bailer test gal./min. with ft. drawdown after hrs.	This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
Artesian flow g.p.m. Date	knowledge sand belief.
Temperature of water 5 4 Was a chemical analysis made? [] Yes No	[Signed] Lillian Vi Almon Date 10] 1967
(10) CONSTRUCTION: Well seal-Material used CEMENT CTROUT	(Drilling Machine Operator) Drilling Machine Operator's License No.
Depth of seal 64 77 ft.	Water Well Contractor's Certification:
Diameter of well bore to bottom of sealin.	This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Were any loose strata cemented off? Yes No Depth	NAME RISTRASSER DRILLING CO
Did any strata contain unusable water? Yes XNo	(Person, firm or corporation) (Type or print)
	Address 8110 SE SUNSET LANE FORTLAND OR
Type of water? depth of strata Method of sealing strata off	a lot y the
1.46	[Signed] (Water Well Contractor)
Was well gravel packed? ☐ Yes No Size of gravel:	Contractor's License No. 10 Date SEPT 241969
· · · · · · · · · · · · · · · · · ·	

WELL LOG, WELL #17

Well Log: Depth drilled 310 ft. Depth of completed well 310 ft.

<u>Material</u>	From	<u>To</u>
Brown Sand	0	22
Fine Blue and Grey Sand	22	43
Light Grey Sand	43	61
Hard Packed Grey Sand	61	64
Grey Sand and Clay	64	73
Hard Packed Grey Sand	73	94
Blue Sand	94	106
Packed Grey Sand	106	148
Grey and Brown Sand	148	160
Water Bearing Sand	160	168
Water Bearing Sand and Fine Gravel	168	231
Sand, Some Gravel	231	240
Sand, Silt, Some Gravel	240	280
Water Bearing Sand, Small amount of Gravel	280	310

Work started June 24, 1969. Completed Aug. 29, 1969. Date well drilling machine moved off of well, Sept. 3, 1969.

Johnson screens, stainless steel. 12" dia., 14 slots set from 170' to 207'. 12" dia., 16 slots set from 221' to 238' 12" dia., 16 slots set from 280' to 300'

NOTICE TO WATER WELL CONTRACTOR The original and first copy E.C.E. WASE WELL REPORT MUL of this report are to be filed with the JUN2 6 1970TA OF OREGON ENGINEER, SALEM, OREGON 97316 JUN2 6 1970TA OF OREGON within 30 days from the date STATE ENGINEER above this line 1 3 1 5 of well completion. State Well No. STATE ENGINEER, SALEM, OREGON 97316 State Permit No. of well completion. SALEM. OREGON (11) LOCATION OF WELL: (1) OWNER: Driller's well number County Name 14 NW 14 Section 23 T. 1 N/ R. Bearing and distance from section or subdivision corner (2) TYPE OF WORK (check): New Well Deepening [] Abandon [Reconditioning [If abandonment, describe material and procedure in Item 12. (4) PROPOSED USE (check): (3) TYPE OF WELL: (12) WELL LOG: Diameter of well below casir Driven 🗌 Domestic 🔲 Industrial 😿 Municipal 🗍 200 ft. Depth of completed well Depth drilled Cable K Jetted [Irrigation | Test Well | Other Bored 🔲 Formation: Describe color, texture, grain size and structure of materials: and show thickness and nature of each stratum and aquifer penetrated, (5) CASING INSTALLED: Threaded | Welded with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates. 146 n. Gage 330 .. ft. to .. MATERIAL From 187 n. to 214 j.j...." Diam. from . BROWN SAND 8 100 SAND AND SILT) PERFORATIONS: Perforated? | Yes | No. 100 SAND SOME GRAVEL Type of perforator used WATER BEAZING SAN 150 180 Size of perforations in. by SAND SOME GRAVEL 180 190 ft to perforations from .. SAND AND SILI 230 140 perforations from . 260 SAND AND GRAUEL *38*0 ... perforations from ... 260 SANDY SILT perforations from perforations from .. SCREENS: Well screen installed? Yes 🛛 No U.O.P. JOHNSON Manufacturer's Name ... Type STAINLESS STEELModel No. Diam. 12 Slot size 15 Set from 148 ft. to 189 ft. Diam. 12 Slot size 15 Set from 229 ft. to 260 ft. (8) WATER LEVEL: Completed well. ft. below land surface Date ic level Artesian pressure lbs, per square inch Date Drawdown is amount water level is lowered below static level (9) WELL TESTS: Was a pump test made? No If yes, by whom? STRASSER UNE 1/1970 20 19 70 Completed 1090 gal./min. with 35 ft. drawdown after // Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief. gal./min. with Baller test ft. drawdown after Artesian flow g.p.m. Date Temperature of water ∠4 Was a chemical analysis made? ☐ Yes 🛭 No [Signed] (Drilling Machine Operator) (10) CONSTRUCTION: Drilling Machine Operator's License No. . Well seal-Material use SOSK& CEMENT GROWT

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. MILLINGE GO) STRASSER (Water Well Contractor Contractor's License No. 10 Date JUNE 15 19 20

Depth of seal 120Fr AND 20 FT

a drive shoe used? Yes | No

Was well gravel packed? | Yes No

Type of water?

Method of sealing strata off

Gravel placed from

Diameter of well bore to bottom of seal 16 ANO 100

Were any loose strata cemented off? Yes No Depth

any strata contain unusable water? 🗆 Yes 🗷 No

depth of strata

Size of gravel:

WELL LOG, WELL #18

Well Log: Depth drilled 300 ft. Depth of completed well 270 ft.

<u>Material</u>	From	<u>To</u>
Brown Sand	0	8
Sand and Silt	8	100
Sane, Some Gravel	100	150
Water Bearing Sand	150	180
Sand, Some Gravel	180	190
Sand and Silt '	190	230
Sand and Gravel	230	260
Packed Sandy Silt	260	300

Work started April 20, 1970. Completed June 11, 1970. Date well drilling machine moved off of well June 11, 1970.

Johnson Screens, stainless steel. 12" dia. 15 slots set from 148' to 189' and from 229' to 260'.

JUN 241985 M

Offsite Wells:
Fairview Farms
Sundial Marine
Sandial Marine

Gresham Sand and Gravel

STATE ENGINEER Salem, Oregon	MULT W	*	COUNTY	VELL NO1N/ Multnoma .TION NOGF	h
OWNER:(b) (6)		MAILING ADDRESS:	(b) (6)	=	
LOCATION OF WELL:	Owner's No. #6	CITY AND STATE:	(b) (6)		
SE 1/4 NE 1/4 Sec. 22	T. 1 S.R. 3	E. W., W.M.			
Bearing and distance from	section or subdivision)			
corner For location s	e sketch on map			(س مار (عائن	_
		***************************************	re de		,
Altitude at well	<u> 26</u> t	************************************	3		4.11000
TYPE OF WELL: Drille	d Date Constructed	1950	B 6.86	-	
Depth drilled 2001			Section	. 22	i
CASING RECORD: 18" from 0 to 140 f 12" from 119 to 200					
AQUIFERS:					
WATER LEVEL:					
PUMPING EQUIPMENT: Capacity 1200	Type Peerless GP.M.	turbi na		——— HP.	75
WELL TESTS:	21 - 21				
Drawdown 12 Drawdown 14					
USE OF WATER Dome.	Totalion & Man	of Temp.	°F.		19
SOURCE OF INFORMAT	TION GR Record	****************************			
DRILLER or DIGGER					-
REMARKS: Irrigation					
Log: Top soil & y		•	0 to 16 ft		
Yellow sand Blue quicksa	and		16 to 27 ft	و مارته الأله	•
Fine gray sa			27 to 49 ft	Sincipo Gennipo	
Brown silt			49 to 82 ft 82 to 94 ft	t. Ship	
_	und - gray clay bi	nder	94 to 136 f	- KMV	COL.
	- small gravel -		136 to 758 f	t. Ships	(~
Coarse sand	- ביים ונשים -	uster hermina	160 +- 100 6	L'H	

NOTICE TO WATER PALL CONTINUETOR
The original and first copy of this report are to be filed with the WATER WE
WATER RESOURCES DEPARTMENT. STATE OF
SALEM. OREGON 97310 (Please tyr. within 30 days from the date
of well completion. (Do not write
(1) UWNER: (b) (6)
Dallie , , , , ,
Address
(2) TYPE OF WORK (check):
New Well) Deepening 및 Reconditioning 및 Abandon 및
If abandonment, describe material and procedure in Rem 12.
(3) TYPE OF WELL: (4) PROPOSED USE (check):
Rotary M Driven Democie Managerial Managerial
Table Jetted Irrigation Test Well Other
CASING INSTALLED: Threaded Welded EX
6 Diam from 0 n to 227 n Gage . 250 5 Diam from n to n Gage . 250
Diam. from
(v) PERFORATIONS: Perforated? [] Yes XXNo.
Type of perforator used
Size of perforations in. by in.
perforations from
perforations from ft to ft
perforations from
Kanufacturer's Name LOP Johnson
Manufacturer's Name IOP Johnson Type stainless Model No.
Manufacturer's Name IOP Johnson
Manufacturer's Name UOP Johnson Type stainless Model No. Diam. 6. Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from n. to n.
Manufacturer's Name UP Johnson Type stainless Model No. Diam. 6 Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom?
Manufacturer's Name UP Johnson Type stainless Model No. Diam. 6 Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15 Set from 228 n. to 238 n. Diam. Stot size Set from ft. to ft. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho II yes, by whom? Was a pump test made? D Yes Tho II yes, by whom?
Manufacturer's Name IOP Johnson Type stainless Model No. Diam 6. Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to ft. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom? 60 gal./min. with 0 n. drawdown after hrs.
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom? Bailer test 60 gal/min. with 0 n. drawdown after hrs.
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Slot size 15 Set from 228 ft. to 238 ft. Diam. Slot size Set from ft. to ft. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes To No If yes, by whom? Baller test 60 gal/min. with 0 ft. drawdown after hrs. General Set from ft. drawdown after hrs. General Set from ft. drawdown after hrs. General Set from ft. drawdown after hrs. General Set from ft. drawdown after hrs. General Set from ft. drawdown after hrs. General Set from ft. drawdown after hrs. General Set from ft. drawdown after hrs.
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Slot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom? Bailer test 60 gal/min. with 0 n. drawdown after hrs.
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from n. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? I Yes Tho II yes, by whom? Bailer test 60 gal/min. with 0 n. drawdown after hrs. Artesian flow g.p.m. Artesian flow encountered n. (9) CONSTRUCTION:
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom? Was a pump test made? D Yes Tho If yes, by whom? Bailer test 60 gal./min. with 0 ft. drawdown after hrs. Artesian flow g.p.m. Arature of water Depth artesian flow encountered ft.
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Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Slot size 15. Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom? Was a pump test made? D Yes Tho If yes, by whom? Bailer test 60 gal./min. with 0 n. drawdown after hrs. Artestan flow g.p.m. Artestan flow g.p.m. Artestan flow encountered ft. (9) CONSTRUCTION: 'cell seal—Material used Cement 'ill sealed from land surface to ft. meter of well bore to bottom of seal 10 in.
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6 Stot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from n. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? I Yes Tho II yes, by whom? Was a pump test made? I Yes Tho II yes, by whom? Bailer test 60 gal/min. with 0 n. drawdown after hrs. Artesian flow g.p.m. Artesian flow encountered n. (9) CONSTRUCTION: 'cll seal—Material used Cement 'ill sealed from land surface to ft. meter of well bore to bottom of seal 10 in. ceter of well bore below seal in.
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from n. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? I) Yes Tho If yes, by whom? Was a pump test made? II Yes Tho If yes, by whom? Bailer test 60 gal./min. with 0 n. drawdown after hrs. Artesian flow g.p.m. Artesian flow encountered n. (9) CONSTRUCTION: 'cll seal-Material used Cement 'ill sealed from land surface to ft. meter of well bore to bottom of seal 10 in. 'crt of sacks of coment used in well seal 9 sacks
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15. Set from 228 n. to 238 n. Diam. Slot size Set from ft. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? D Yes Tho If yes, by whom? Was a pump test made? D Yes Tho If yes, by whom? Bailer test 60 gal./min. with 0 ft. drawdown after hrs. Artestan flow g.p.m. Artestan flow g.p.m. Artestan flow encountered ft. (9) CONSTRUCTION: 'cell seal-Material used Cement 'tell seal-Material used Cement
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from n. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? I) Yes Tho If yes, by whom? Was a pump test made? II Yes Tho If yes, by whom? Bailer test 60 gal./min. with 0 n. drawdown after hrs. Artesian flow g.p.m. Artesian flow encountered n. (9) CONSTRUCTION: 'cll seal-Material used Cement 'ill sealed from land surface to ft. meter of well bore to bottom of seal 10 in. 'crt of sacks of coment used in well seal 9 sacks
Manufacturer's Name IOP Johnson Type stainless Model No. Diam. 6. Stot size 15 Set from 228 n. to 238 n. Diam. Slot size Set from n. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? I) Yes Tho If yes, by whom? Was a pump test made? II Yes Tho If yes, by whom? Bailer test 60 gal./min. with 0 n. drawdown after hrs. Artesian flow g.p.m. Artesian flow encountered n. (9) CONSTRUCTION: 'cll seal-Material used Cement 'ill sealed from land surface to ft. meter of well bore to bottom of seal 10 in. 'crt of sacks of coment used in well seal 9 sacks
Manufacturer's Name INP Johnson Type Stainless Model No. Diam. 6. Slot size 15 Set from 228 n. to 238 n. Diam. 5. Slot size Set from ft. to ft. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? Des Two If yes, by whom? What is a pump test made? Des Two If yes, by whom? Bailer test 60 gal./min. with 0 ft. drawdown after hrs. Artesian flow s.p.m. Arature of water Depth artesian flow encountered ft. (9) CONSTRUCTION: Cell seal-Material used Cement Sealed from land surface to ft. meter of well bore to bottom of seal in. Ceter of well bore below seal in. Cet of sacks of cement used in well seal pumped drive shoe used? Des Des Des Size: location ft.
Manufacturer's Name INP Johnson Type Stainless
Manufacturer's Name IOP Johnson Type stainless Model No. Diam 6 Slot size 15 Set from 228 n. to 238 n. Diam 5 Slot size 5 Set from n. n. to n. Manufacturer's Name IOP Set from 228 n. to 238 n. Diam 5 Slot size 5 Set from n. n. to n. (8) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? I Yes No If yes, by whom? Was a pump test made? I Yes No If yes, by whom? Saller test 60 gal./min. with 0 n. drawdown after hrs. Artesian flow 8.p.m. Artesian flow 10 Sept. Artesian flow encountered n. Well seal—Material used Cement Well seal—Material used Selection Well seal—Material used Cement Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection Well seal—Material used Selection
Manufacturer's Name INP Johnson Type Stainless

¥	:		14-19
L REPORT	4.1.	₹-	111/
DELIGO MULT State Well No.	1W/-	<u> </u>	14c
or plint) over this late) 001251 State Permit N	i '		
ove his He) UU1201 State Permit N	o		**********
(10) LOCATION OF WELL:			
County Multnomah Driller's well no			
SW 14 SW 14 Section 14 T. IN	R. 3E		W.M.
Bearing and distance from section or subdivisi	on come	·r	
(11) WATER LEVEL: Completed w	eli.		
Depth at which water was first found	30		ft.
Static level 25 #t. below land s	urface.	Date 12-	19-79
Artesian pressure lbs. per squar	e inch.	Date	
(12) WELL LOG			
(12) WELL LOG: Diameter of well i			<u></u>
Depth drilled ZJB ft. Depth of compl			n.
Formation: Describe color, texture, grain size; and show thickness and nature of each stratu	and struc	ture of s	naterials:
will at least one entry for each change of forme	Han Dan		-b
position of Static Water Level and indicate prin	cipal wa	ter-bearb	eg strate.
MATERIAL	From	To	SWL
mucky sand mucky sand & clay	0	16	
sand, water	16	30	
sand, wood, water	30 85	8 <i>5</i>	
	כטו	TO	
sand	100	125	
	100	135 180	
sand	100 135 .180	135 180 222	25
sand sand, water	135	180 222	25
sand sand, water sand & water some silt	135 .180	180	25
sand sand, water sand & water some silt	135 .180	180 222	25
sand sand, water some silt	135 .180	180 222	25
sand sand, water some silt sand & gravel water	135 .180	180 222	25
sand sand, water sand & water some silt sand & gravel water	135 .180	180 222	25
sand sand, water some silt sand & gravel water	135 .180	180 222	25
sand sand, water sand & water some silt sand & gravel water	135 .180	180 222	25
sand sand, water sand & water some silt sand & gravel water	135 180 222 V F 1979	180 222 23 3	25
sand sand, water sand & water some silt sand & gravel water	135 180 222 V F 1979	180 222	25
sand sand, water sand & water some silt sand & gravel water	135 180 222 V F 1979	180 222 23 3	25
sand sand, water some silt sand & gravel water	135 180 222 1979	180 222 23 3	25
sand sand, water some silt sand & gravel water	135 180 222 V E 1979	180 222 23 3	
sand, water sand & water some silt sand & gravel water Work started 12-14 19 79 Complete Date well drilling machine moved off of well	135 180 222 1979 	180 222 23 3	1979
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my	135 180 222 1979 1979 12-1	180 222 233 1=91	1979 19 79
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my Materials used and information reported	135 180 222 1979 1979 12-1	180 222 233 1=91	1979 19 79
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my Materials used and information reported best knowledge and belief.	135 180 222 1979 1979 12-1 direct above	180 222 233 233 -19 9- super true	1979 19 79
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my materials used and information reported best knowledge and belief [Signed] (Dating Machine Operator)	135 180 222 1979 1979 12-1 direct above	180 222 233 1=91	1979 19 79
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my Materials used and information reported best knowledge and belief. [Signed]	135 180 222 1979 1979 12-1 direct above	180 222 233 233 -19 9- super true	1979 19 79
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my materials used and information reported best knowledge and belief [Signed] (Dating Machine Operator)	135 180 222 1979 1979 12-1 direct above	180 222 233 233 -19 9- super true	1979 19 79
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my Materials used and information reported best knowledge and belief, [Signed] (Dading Machine Operator's License No. Water Well Contractor's Certification:	135 180 222 1979 1979 12-1 direct above	180 222 233 233 -19 9- super are true	1979 19 79 vision. to my
work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my materials used and information reported best knowledge and belief [Signed] (Dading Machine Operator's License No. Water Well Contractor's Certification: This well was drilled under my jurisditute to the best of my knowledge and belief	135 180 222 1979 1979 12-1 direct above Date	180 222 233 233 -19 9- super are true	1979 19 79 vision. to my
work started 12-14 19 79 Complete Work started 12-14 19 79 Complete Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my materials used and information reported best knowledge and belief [Signed] (Drilling Machine Operator's License No. Water Well Contractor's Certification: This well was drilled under my jurisditure to the best of my knowledge and belief true to the best of my knowledge and belief than sen Drilling Co., Inc.	135 180 222 1979 1979 12-1 direct above Date	180 222 233 233 1221 1221 1221 1220	1979 19 79 vision. to my
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Diameter of well bore to bottom of seal _______in.

Did any strate contain unusable water? Tes To

a drive shoe used? Tes | No

Was well gravel proked? Tyes WNo

ype of water?

ethod of sealing strata off

ere any loose strata comented off? Tes Tho Depth

Size of gravel;

JOHNAT CLUMEL. GRESHAM SAND COLD

WATER WELL REPORT OTICE TO WATER WELL CONTRACTOR The original and first conv of this report are to be filed with the STATE OF OREGON State Well No. /N/3-/4 TATE ENGINEER, SALEM, OREGON 97310 (Please type or print) . MUL within 30 days from the date (Do not write above this line) State Permit No. . of well completion. . . : 4 O^(b) (6) (11) LOCATION OF WELL: County Multnomak Driller's well number 111 7.17 32 Section Bearing and distance from section of subdivision corner 2) TYPE OF WORK (check): New Well IR Deepening Reconditioning Abandon [] f abandonment, describe material and procedure in Item 12. 3) TYPE OF WELL: (4) PROPOSED USE (check): (12) WELL LOG: , Driven 🗆 Rotary П Domestic [Industrial | Municipal | Jetted 🔲 Depth drilled 127 ft. Depth of completed well Irrigation | Test Well | Other Bored [Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated. D. CASING INSTALLED: Threaded [] Welded Ela with at least one entry for each change of formation. Report each change The state of the s in position of Static Water Level as drilling proceeds. Note drilling rates 6 Diam from 0 n to 120 n Gage 290 MATERIAL. From ." Diam. from ft. to ft. Gage . SAND FINAL RLACK SAND FIN & CRYY WATER ___ 'ERFORATIONS: Perforated? Tes . W No. SAND FINE WIGH GRALL ype of perforator used MICT CORPER WATER BURGERS in. by ize of perforations SANG FINA GRATELICH perforations from WATER BEARING perforations from perforations from ____ perforations from ____ Well green installed? Yes INO 7, SCREENS: Manufacturer's Name 21-22020 iam 6 1 Stot size 153 Set from 125 ft. to 1 Diam. 6 14 Slot size 10. Set from 12. 1. to 125 ft. 8) WATER LEVEL: Completed well. level ft. below land surface Date NoV 10 Ibs: per square inch Date Artesian pressure Drawdown is amount water level is lowered below static level P) WELL TESTS: as a pump test made? Tes To No If yes, by whom? Work started Och 26 19 67 Completed NOV 10 196) gal./min. with ft, drawdown after hrs. Date well drilling machine moved off of well Nau Drilling Machine Operator's Certification: This well was constructed under my direct supervision. Mategal./min. with U ft. drawdown after 2 rials used and information reported above are true to my best knowledge and belief. g.p.m. Date emperature of water 🙋 Was a chemical analysis made! 🛛 Yes 📋 No (10) CONSTRUCTION: ell seal-Material useq BENTONITE epth of seal 19

Water Weli Contractor's Certification:

This well was drilled under my jurisdiction and this report is

true to ti	is pest of my know			
NAME .	Skyles	ולו לו וכ	2 + Sup	بر ابرد
	(Person, firm or e	orbotation)	- (Type or print	' J
Address	2100	stone	Gores	1011
				•
[Ciamod]	Home	u The	Resper	
[Signed]		(Water Wall Conserve)		

Appendix F Quality Assurance Sampling Plan

OU1 Quality Assurance Sampling Plan for: Reynolds Metals Facility Troutdale, Oregon

1.0 Background

The Reynolds Metals Facility is a primary aluminum reduction plant that has operated on an 80-acre site outside Troutdale, Oregon since 1942. To address the complex nature of this site with multiple production processes, waste streams, and disposal practices, the site has been divided into operable units (OUs) based on media, waste source type, and site geographical location. OU 1 encompasses the south and east potliner disposal areas, the cryolite pond, the facility scrapyard, the wetlands area, the north industrial landfill, and the parking lot. The media of concern include surface soil, subsurface soil, surface water, sediment, and groundwater.

The types of activities at this site that contributed to the wastes of concern to the Environmental Protection Agency's (EPA's) on-scene coordinator (OSC) include: reduction of alumina to aluminum metal and associated production processes; onsite disposal of potliners (carbon-lined reduction cells, a listed hazardous waste with waste identification number K088) and other production waste streams; the alleged use of potliners as a fill material in the construction of the facility parking lot; the alleged storage/disposal of polychlorinated biphenyl (PCB)-contaminated debris in the potliner disposal area; the recovery of cryolite in the cryolite recovery pond; and the release of free elemental mercury and other potentially hazardous substances from facility equipment discarded at the onsite scrapyard.

The major soil contaminants identified in Reynolds Metals facility soil and summarized in the Site Inspection Prioritization (SIP) report (PRC 1993) are listed in Table 1. The concentrations are of concern because they are elevated above background sample levels and/or risk-based concentrations established by the State of Oregon and EPA (E & E 1994). PCBs are also a contaminant of concern based on extensive historical use of

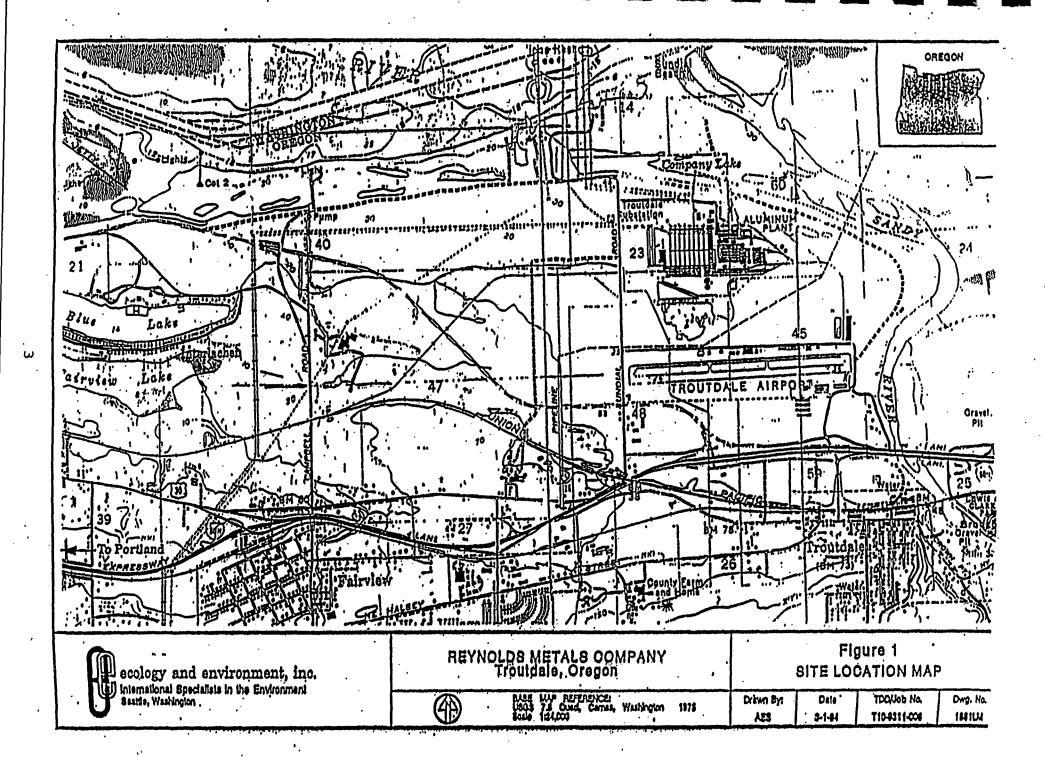
electrical equipment that contains PCB oils. Although in a previous investigation different media were sampled for PCBs, all of the analytical data were rejected because of organic interferences, hence, there is no PCB information available for the site.

Table 1 Constituents and Concentrations of Concern in Soil					
Constituent	Concentration (mg/kg)				
Total polynuclear aromatic hydrocarbons	4,071				
Aluminum	322,000				
Copper .	8,770				
Cyanide	57.6				
Fluoride	137,000				
Notes 1. Data from the SIP Report (PRC 199 2. mg/kg = milligrams per kilogram	93)				

The site is located north of the City of Troutdale, in Multnomah County, Oregon (see Figure 1). The nearest residences are located 0.5 mile to the south. Significant environments in the proximity of the site include wetlands located directly adjacent to the south side of the facility and Company Lake with associated wetlands directly north of the facility. Other significant environments include the Sandy River 0.25 mile east of the facility and the Columbia River 0.75 mile to the north.

2.0 Project Objectives

As this site may pose an imminent and substantial threat to public health and/or the environment, time considerations are a significant factor in the design and execution of this plan. The objectives of the proposed field activities are to:



- Determine if potliners and other wastes are present in the south or east potliner disposal area, the cryolite pond, beneath the parking lot, in the north industrial landfill, or in the south wetlands.
- 2. If potliners are found, perform an extent of contamination (EOC) in the vertical and horizontal directions. If potliners are not found, perform a limited EOC survey of contaminated soil in the south and east potliner disposal areas, the cryolite pond, and in the parking lot.
- 3. Design and install a groundwater monitoring well network and sampling program to determine depth to groundwater, hydraulic gradient, and extent of shallow groundwater contamination, if present, attributable to past practices related to potliner disposal or other sources.
- 4. Conduct an EOC survey of contaminated surface and subsurface soil in the scrapyard area.
- Conduct a reconnaissance of the floodplain area (between the Sandy and the Columbia Rivers) and other target areas. Document suspicious stains, ground surface features and disturbances and collect grab samples as needed.
- 6. Collect groundwater samples from existing onsite production wells for water quality analysis. Perform quality assurance (QA) level 3 analysis on Reynolds' production well number 18 (PW-18) to establish level of confidence in deep groundwater quality data.
- 7. Collect sediment samples from Company Lake near the refractory brick debris pile on the Corps of Engineers (COE) dike to check for indications that PCBs may have leaked from capacitors alleged to have been buried in

the dike. If feasible, conduct a surface geophysical survey in selected areas in an attempt to locate the site where capacitors were allegedly disposed.

 Collect sediment/surface water samples from the Company Lake outflow to the Columbia River to determine if contaminants related to site operations are present.

The data will be screened against EPA Region 10 Supplemental Risk Assessment Guidance for Superfund Criteria; EPA Safe Drinking Water Act National Primary and Secondary Drinking Water Regulations; EPA Region 3 Risk-Based Concentration Table Values; Oregon Department of Environmental Quality (DEQ) Environmental Cleanup Rules; Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario; State of Wisconsin Guidelines for Maximum Allowable Concentrations of Contaminants in Great Lake Sediments; and EPA Federal Water Quality Criteria for Surface Waters; although these criteria ultimately may or may not be applicable or appropriate for setting cleanup criteria for affected media at this site.

3.0 Quality Assurance Objectives

In accordance with the objectives outlined in Section 2.0, and the QA levels defined by the EPA (EPA 1990c), the sampling and analyses performed under this sampling effort will conform to the use and QA criteria summarized in Table 2.

Table 2 Data Use and Quality Assurance Objectives					
Parameter	QA Objectives				
Cyanide	Soil, air, sediment, water	Assessment, EOC, risk determination	· QA 2		
ТРАН	Soil, air, sediment, water	Assessment, EOC, risk determination	QA 2		
Metals .	same	same	QA 2		
Fluoride	same	same	QA 2		
PCBs	same	same	QA 2		
Cyanide, metals	1 PW water	Bias, level of confidence in laboratory's performance	QA 3		

4.0 Methodologies

4.1 Samples

All samples will be collected, identified, and handled, and all documentation and chain of custody procedures will be conducted in accordance with Region 10 Removal Program guidelines and protocols. The QA Level 2 and 3 QA Requirements and QA 2 Validation Requirements will be as mandated by EPA guidelines (EPA 1990c). Other operating procedures that will be used in this sampling effort are generally consistent with those described in Appendix B of the Technical Assistance Team's Sampling Plan for the Reynolds Metals Troutdale Facility (E&E 1994). These include:

Field Logbook Geoprobe Large Bore Sampler SOP Sample Equipment Decontamination Sample Documentation Soil Sampling Waste Pile Sampling Monitoring Well Installation Surface Water Sampling Well Development Sediment Sampling Water Level Measurement General Air Sampling Guidelines Groundwater Well Sampling Immunoassay Field Screening QA/QC Potable Water Sampling GPS Draft SOP-under development

The equipment listed in Table 3 will be used to obtain samples during the course of this project.

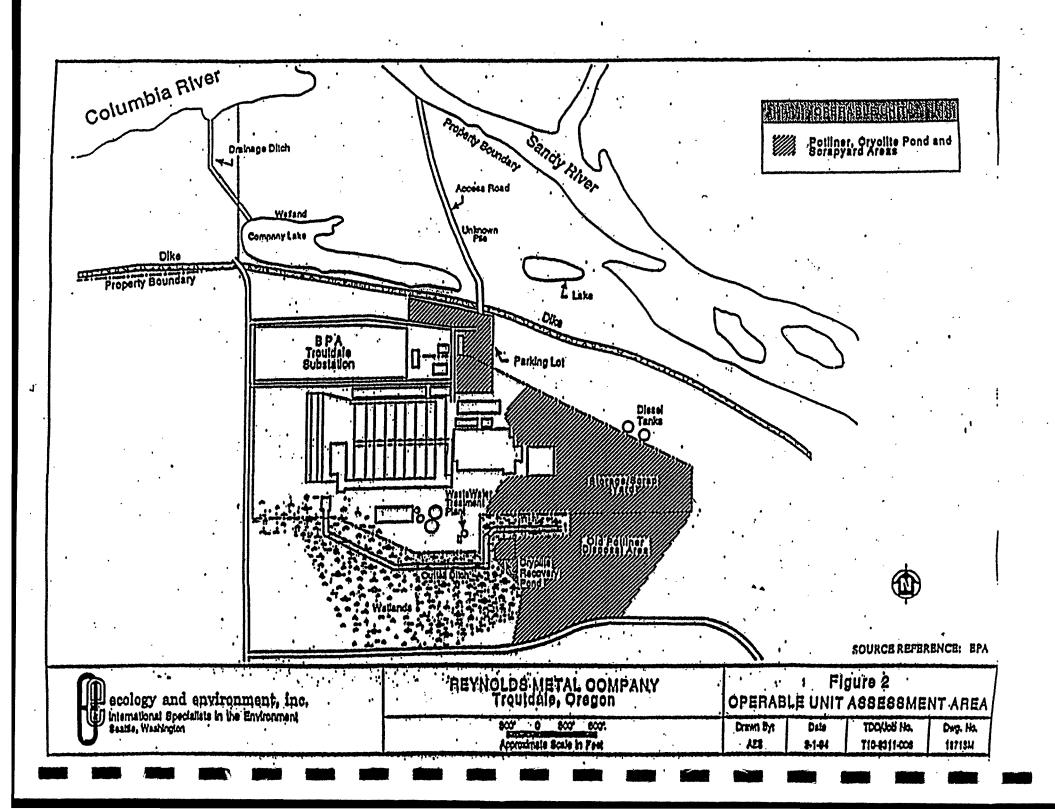
Matrix	Sampling Equipment	Dedicated	
Soil	Geoprobe Large Bore Sampler with acetate liner Split-spoon sampler Bowls and spoons Sample Containers	Steel Plastic Steel Stainless Steel Glass	No Yes No Yes Yes
Sediment	Ekman Dredge (or equivalent) Bowls and Spoons Sample Containers	Steel Stainless Steel Glass	No Yes Yes
Groundwater	Teflon Bailers Submersible pump Sample Containers	Teflon plastic Stainless Steel Glass/Plastic	No No Yes
Surface water	Sample Containers	Glass/Plastic	Yes
Ambient air (as needed)	HIVOL Air Samplers PUFS filters Filter Papers	Aluminum Polyurethane Foam Quartz Microfibre Cellulose Acetate	No Yes Yes Yes

4.2 Sampling Rationale

The anticipated assessment areas for OU 1 are outlined on Figure 2. Several additional areas have been identified through the initial reconnaissance that will be investigated in addition to the areas shown on Figure 2. These areas are

- The eastern potliner disposal area
- The south wetlands
- The industrial landfill
- The small cryolite ponds

The sampling and analysis strategy is based on the following rationale.



General

This section describes the sampling and exploration areas for the Phase 2 soil sampling effort. Soil sampling with backhoe and hand auger will commence the week of July 17 with one crew. Soil exploration with geoprobe will commence the week of July 25. If potliners are identified and initial screening indicates that surface geophysical techniques may be helpful in mapping the extent any identified potliner, as discussed below, the geophysical survey will commence as soon as schedule permits, either the week of August 15 or August 22.

Geophysical methods will be considered for use in mapping the vertical and horizontal extent of the suspected potliner disposal areas. The method which would be used is electromagnetics, using the EM-61, which can detect contrasts in soil or medium conductivity at depths up to about 15 feet. Verification sampling would be performed using hand sampling and geoprobe sampling as discussed below.

Geophysical methods will also be considered for use in attempting to locate the allegedly buried capacitors. A magnetometer will be evaluated for use in scanning the dike adjacent to the COE dike, the north industrial landfill, the north parking lot, and the clearing in the woods near the plant outfall which was noted in aerial photographs. The method may not be effective when in the proximity of the BPA power lines.

In general, soil sampling will be performed either with stainless steel spoons, acetate lined Geoprobe sleeves or stainless steel hand auger. Spoons will be discarded after each sample is taken. A new (dedicated) sleeve will be used for each geoprobe sample, and the geoprobe probe, auger and backhoe bucket will be decontaminated between sampling events or test holes. Where possible, the backhoe bucket and/or auger flight will be decontaminated by pressure washing into the backhoe pit or auger excavation.

For the initial sampling effort, samples will be taken at the intervals discussed below for the various areas. Samples will be composited vertically, where indicated, and discrete samples will also be collected. Based on the initial sample results, additional testing of discrete samples will be conducted. The purpose of compositing the samples is to perform a broad survey to determine the horizontal distribution of the various constituents. If constituents of concern for the Reynolds Metals facility are found in specific areas, discrete samples may be tested to determine the vertical distribution of the constituents.

Test pits will be backfilled with the excavated soil after sampling is completed.

Approximately 10 percent of the screened samples (PCB and TPAH) will be tested by rigorous methods in the laboratory. A complete list of proposed laboratory tests including methods and numbers of tests will be developed as the project progresses.

This document is intended to be a planning tool, and as such, may be revised as the project progresses and as actual conditions are uncovered in the field. For example, if it is not possible to penetrate the potliner area with the geoprobe, it may be better to perform additional exploration with the backhoe. Similarly, if geophysics are not appropriate for exploration of the potliner disposal area, more backhoe pits may be employed to help determine the lateral and vertical EOC.

Potliner Disposal Area

The rationale for exploring and sampling in this area is to determine the lateral and vertical extent of any remnant potliner and any remnant contamination.

·Initial exploration:

- Dig 11 test pits to native ground (if possible), or to 7.5 feet, or to the groundwater table.
- Sample at surface, 2.5 feet, 5 feet, and 7.5 feet.
- Identify potliner visually and confirm with limited laboratory analytical.
- Soil samples will be screened in the laboratory for TPAH, cyanide, and fluoride.
- Selected soil samples will be screened for 13 metals and PCBs.

If potliners are found:

- Screen potliner matrix and native soil for electrical resistivity using conventional hand-held soil resistivity gear.
- If contrast in resistance between potliner matrix and native soil is adequate, plan to determine lateral and vertical extent of contamination with geophysical methods (EM).
- Do confirmation borings with Geoprobe. Estimate four Geoprobe holes to a depth of 10 feet, or to the groundwater table. Sample continuously and test 0-2 foot interval, 2-4 foot interval, 4-6 foot, etc.

If potliners are not found:

 Do confirmation borings with Geoprobe. Do 8 probes to maximum depth of 10 feet, or to groundwater table. Sample continuously and test as above.

Cryolite Pond and Small Cryolite Ponds

The rationale for sampling in the cryolite pond area is to determine the lateral and vertical EOC and potential migration patterns. The following work will be conducted:

- Drill two test holes in the main cryolite pond using a power auger.
- Drill one test hole in each of two smaller ponds using a hand auger.
- Drill two test holes in native ground adjacent to the main cryolite pond using a hand auger.
- Take samples at the surface, 2.5-foot depth and the 5-foot depth.
- Perform laboratory screening on composite samples for TPAH, cyanide and PCB. Perform laboratory testing for fluoride and 13 metals from discrete samples from native soil (if encountered).
- Make visual estimate of the horizontal extent of cryolite and measure using survey techniques.

Parking Lot

The rationale for sampling in the parking lot is to investigate past allegations that potliners may have been used as fill for the parking lot. The following work will be conducted:

- Perform four test probes using the Geoprobe in the parking lot area to a maximum depth of 7 feet (or to groundwater).
- Take samples from the following depth intervals: 1-3 feet, 3-5 feet, and 5-7 feet.
- Perform laboratory screening tests on discrete samples for TPAH, cyanide, and fluoride.
- Based on the laboratory results, if potliners are indicated, plan additional
 Geoprobe holes to determine the horizontal and vertical EOC.

Scrapyard -

The SIP sampling showed elevated concentrations of TPAH and metals. The rationale for the sampling will be to determine the vertical and horizontal extent of contamination.

- Perform up to 15 backhoe test pits in the scrapyard.
- Take samples from 0-2 foot interval and 2-4 foot.
- Perform laboratory screening on composite samples for TPAH, cyanide, fluoride and PCBs.

• Perform laboratory screening for 13 metals on selected samples, primarily in the area where mercury was cleaned up in 1993.

Eastern Potliner Area

During the groundwater investigations, suspected potliner was discovered at the eastern end of the site. The purpose of investigating in this area is to determine the lateral and vertical EOC.

- Excavate 8 test pits in the area to a depth of 4 feet or to the groundwater table.
- Take samples at surface, 2-, and 4-foot depths.
- Perform laboratory screening on composite soil samples for TPAH, cyanide and fluoride.
- Perform laboratory screening for PCBs and 13 metals on selected samples if the area appears to be a scrapyard.
- If buried potliner is discovered, geophysical methods will be considered similar to those discussed above to determine the lateral and vertical EOC.
- Based on the field investigations and laboratory analysis, plan additional
 Geoprobe holes or test pits to confirm lateral and vertical EOC.

South Wetlands

No samples were taken in the south wetlands area during the SIP. Early aerial photographs indicate that the wetlands area served as a process water discharge pond

during the early years of the plant operation. The rationale for sampling in the wetlands is to determine whether contamination is present (incidence of contamination, or IOC).

- Perform 5 hand auger borings to depth of 3 feet.
- Take samples at surface and at the 3-foot depth.
- Perform laboratory screening on composited samples for TPAH, PCB,
 cyanide, fluoride, 13 metals, TPH and pesticides.
- Based on the field investigations and laboratory analysis, plan additional field investigations to determine lateral and vertical EOC.

North Industrial Landfill

Sampling and analysis performed by CH2M HILL in June 1994 in the industrial landfill east of the road showed elevated levels of PAH and PCB, as well as some asbestos. The rationale for sampling west of the road is to determine the relative concentration of constituents in the landfill.

- Perform eight test pits up to 12 feet deep (to groundwater or to native ground).
- Take up to three samples per test pit.
- Perform laboratory screening on composite samples for TPAH, PCB, 13 metals, cyanide, fluoride, and asbestos (if indicated).
- Visually determine horizontal extent of landfill and measure using survey techniques.

Miscellaneous Sampling Areas

Several additional disturbed areas were noted during initial site reconnaissance activities and were sampled. These areas were:

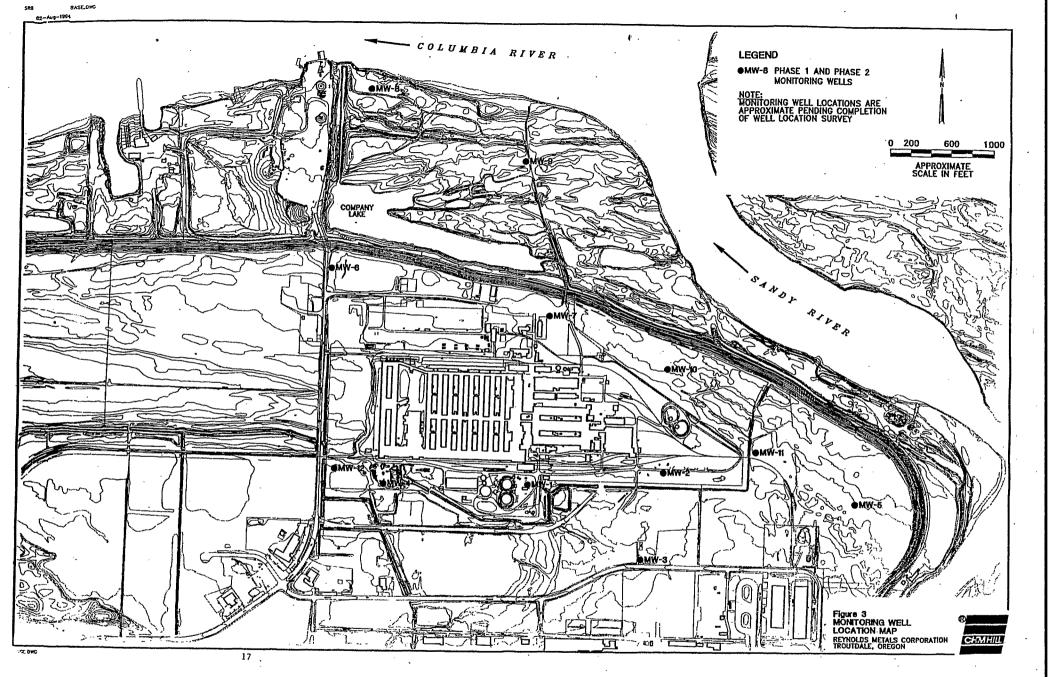
- The stressed-vegetation area south and west of the south potliner area.
 Surface samples were taken from this area and tested for cyanide, fluoride,
 PCBs, 13 priority pollutant metals and TPAH.
- The sand preload area southwest of Potline 5 was sampled and tested for cyanide, fluoride, PCBs and TPAH.

Groundwater

Past Work. Detectable concentrations of cyanide and fluoride were detected in groundwater samples collected by PRC from the onsite deep production wells (PRC 1993). These onsite wells supply the facility with process and drinking water.

A total of eight shallow groundwater monitoring wells were installed by Reynolds Metals during the Phase 1 groundwater investigation using hollow stem auger drilling techniques. Monitoring well locations are shown on Figure 3. Monitoring wells were either two or four inches in diameter, depending on the potential for future use as extraction wells, should groundwater remediation be required. The locations of the shallow monitoring were mutually agreed to by Reynolds Metals and EPA on the basis of available information regarding past practices at the Troutdale facility.

A water level monitoring program was initiated soon after well installation by installing data loggers and transducers in the Columbia River and in MW-8, -6, and -5. This



network of continuous groundwater level monitoring will be supplemented by periodic manual measurements in other monitoring wells at the facility. To improve the understanding of groundwater hydraulics at the facility, the data logger network may be adjusted by moving the transducers and loggers to alternative wells.

Ongoing and Future Work. The eight shallow monitoring wells were sampled and samples analyzed during the week of July 18, 1994. After the data from this sampling round has been evaluated, Reynolds Metals will meet with EPA to discuss the results of the sampling event and the results of the water level monitoring program. The need for and location of any additional monitoring wells will be established at that time. If indicated by the data collected during Phase 1 or other information regarding past practices at the Troutdale facility, additional monitoring wells will be installed using similar techniques as used for Phase 1 monitoring wells. After their installation, Phase 2 monitoring wells, selected Phase 1 monitoring wells, and selected production wells will be sampled and the samples analyzed for a list of constituents agreed upon by Reynolds Metals and EPA.

The scope of any ongoing, periodic groundwater monitoring program for the facility will be determined as indicated on the basis of the results of sampling and analysis conducted during the Phase 1 and Phase 2 monitoring well installation programs.

Sample Analysis. Groundwater samples collected by CH2M HILL for Reynolds Metals will be analyzed in the laboratory for total petroleum hydrocarbons (TPH), volatile organic compounds (VOC), semivolatile organic compounds, plus polynuclear aromatic hydrocarbons (PAH), PCBs, pesticides, total cyanide (supplemented by a free cyanide analysis if total cyanide analysis yields detectable concentrations of cyanide), fluoride, and EPA's toxic analyte list of 23 metals. Groundwater samples will be analyzed in the field for temperature, pH, and electrical conductivity.

Surface Water and Sediments

Reynolds Metals proposes to collect surface water samples at the following locations:

- From the outflow from Company Lake before it empties into the Columbia
 River to assess the quality of water flowing into the river from Company
 Lake.
- From the Columbia River near the Company Lake outfall to assess the water quality in the Columbia River downstream of the Company Lake discharge.
- From the Columbia River upstream of the Sandy River confluence to provide background river water quality data.
- From the eastern part of Company Lake to assess water quality away from the main inflow/outflow pattern in Company Lake.
- From Salmon Creek just downstream of the reported connection between the creek and the plant waste water collection ditch to assess possible impacts to the creek water quality.

Sediment samples will be collected from the following locations:

- From the Company Lake drainage ditch before it empties into the Columbia River to assess concentrations of sediments potentially entering the river.
- Two samples from the Columbia River, one east and one west of where the
 Company Lake discharge ditch enters the river, to assess sediment

concentrations near the Company Lake discharge. Two samples will be collected because of observed backwater flow patterns in the Columbia River at the Company Lake discharge.

- Two samples from the Columbia River upstream of the Sandy River confluence to provide background sediment quality data.
- Five samples from Company Lake, three in the eastern part of the lake to assess possible effects of the debris pile, one in the middle part of the lake, and one in the western part of the lake.
- Two samples from Salmon Creek, one just downstream of the possible connection with the plant waste water collection ditch and one near Reynolds Metals' property boundary.

In the SIP effort, all sample results for PCB analyses were qualified as rejected because of organic interferences. In this investigation, the samples will undergo a modified cleanup step in the laboratory in an attempt to obtain acceptable data.

Reconnaissance

Visual reconnaissance on foot and bicycle will be performed in accessible areas of the wooded floodplain area between the Columbia and Sandy Rivers. Stained and disturbed soil locations and unusual ground surface features will be documented. A minimum of one surface soil or product grab sample will be collected at each suspicious location.

Reconnaissance will be performed on the south and west boundaries of the south wetlands area with the intent of noting any cross drainages and/or any unmapped influent pipes, gates, overflows or structures. Any unusual features and/or sample locations which are noted during the reconnaissance will be marked and subsequently surveyed in.

In March 1994, 650 tons of soil containing Bunker-C fuel oil was excavated from the area northeast of the fuel tanks and disposed at the Waste Management facility in Arlington, Oregon. Diesel contamination was discovered below the excavated oil. Soil samples were collected and analyzed for TPH, PCBs, Volatile Organic Compounds and the toxicity characteristic leaching procedure for 8 metals. The oil contamination below the excavated soil was found to be diesel and heavy oil; no PCBs, VOCs or metals were detected.

Onsite Production Wells

The five production wells sampled during the EPA's site investigation will be resampled and analyzed for the same constituents as monitoring wells. Production well sampling will occur during the same sampling effort as the Phase 2 monitoring wells.

Surveying and Geographic Information System

Sample locations and elevations will be determined using standard survey techniques. Monitoring well elevations will be determined by differential levelling techniques using the WILD NA2 optical level. Vertical elevations will be referenced to National Geodetic Vertical Datum (NGVD) and will be accurate to 0.01 foot. A first-order control point has been identified near the site and the elevation datum has been transferred to the site.

All well locations and soil sample locations and elevations will be surveyed using either a WILD T1600 total station theodolite with a DI2000 EDM or a Trimble 4000 GPS system. Horizontal control has been established using the Trimble 4000 GPS system. Because it is not possible to survey all locations using GPS because of the tree cover north of the dike, some locations will require survey by manual techniques. Horizontal control will be referenced to State-Plane coordinates.

All horizontal and vertical coordinates for all wells and sampling locations will be stored in an electronic data package which is compatible with the existing GIS mapping for the Reynolds Metals Troutdale facility.

Air Sampling

As part of the site-specific health and safety plan, the following air monitoring equipment will be used during site activities:

- Flame ionization or photoionization organic vapor detector
- Hydrogen cyanide meter
- Combustible gas meter (invasive activities only)
- Oxygen meter (invasive activities only).

Fugitive dust emissions are not anticipated to be generated during site investigation activities, with the exception of test pits being excavated by backhoe. Each test pit and spoils pile will be sprayed with water periodically during excavation if dust is observed. In the unlikely event it will not be possible to prevent dust migration offsite during test pit excavation activities because of a combination of dry soil conditions and high wind velocities, perimeter air monitoring will be instituted.

4.3 Sample Types and Quantities

The proposed OU 1 assessment areas, other reconnaissance/assessment areas, the sample collection activities, the estimated number of samples, and the required QA/QC samples for each activity are listed in Table 4.

	Table 4 Sample Locations and Quantities							
Area	Activity	No. Composite Samples	Laboratory Composite Analysis	No. Discrete Samples	Laboratory Discrete Analysis	Comments		
Soil Sampling					,			
Eastern Potliner	8 test pits	9	тран, РСВ, CN	27	TBD			
Southern Potliner	11 test pits	13	TPAH, PCB, F, CN	34	TBD	11 composites analyzed for 13 metals		
North Landfill SHN	4 test pits	4	TPAH, PCB, F, CN	10	TBD	3 composites analyzed for 13 metals		
North Landfill EHW	3 test pits	3	TPAH, PCB, F, CN	9	TBD	2 composites analyzed for 13 metals		
Scrap Yard	15 test pits	13	ТРАН	40	TBD	3 composites analyzed for 13 metals		
Parking Lot	4 geoprobe			12	TPAH, CN, PCB			
Cryolite Pond	6 hand auger holes	4	ТРАН, РСВ, CN	15	TBD	2 composites analyzed for fluoride		
South Wetlands	5 hand auger holes	5	TPAH, PCB, CN, F, pesticides, TPH	10	TBD			
Stressed Veg.	2 hand auger holes	. 2	TPAH, PCB, CN, F, pesticides, 13 priority pollutant metals	4	TBD			
Reconnaissance	Activities							
Soil/Product	Estimate 10	0	0	10	TBD			
Surface Water/Sediment								
Water	Company Lake, Columbia River, Salmon Creek		0	5	PAH, PCB, cyanide, fluoride, TAL metals			
	J							

			<u> </u>	1	1		
Sediment	Company	0	0	12	РАН, РСВ,		
	Lake,		,		cyanide,		
	Columbia			·	fluoride,		
	River,				TAL metals		
	Salmon					-	
	Creek						
Monitoring We	ll Installation a	and Sampling	,	<u> </u>	* ···	•	
Soil	12	0	0	36	РАН, РСВ,	Samples screened in laboratory for	
	boreholes,				TPH,	TPH, PCB, PAH. Fluoride, metals	
	3 soil				cyanide,	and cyanide are standard laboratory	
,	samples				fluoride,	analysis. 10 percent of soil samples	
	per				TAL metals	will be analyzed for TPH, PCB, and	
	borenoie					PAH to confirm data.	
Water	12 wells	0	0	.12	voc, svoc		
					plus PAH,		
•		,			РСВ, ТРН,		
				·	pesticides,		
					cyanide,		
					fluoride,		
,					TAL metals		
Production We	lls	·		<u> </u>			
Water	5 wells	0	0	5	voc, svoc		
			,		pius PAH,		
					РСВ, ТРН,		
					pesticides,		
•					cyanide,	,	
•					fluoride,		
					TAL metals		
TBD = To be determined							

4.4 Equipment Decontamination

Decontamination procedures will be generally consistent with those described in Appendix B of the Technical Assistance Team's Sampling Plan for the Reynolds Metals Troutdale Facility (E&E 1994). Geoprobe rods and drilling auger flights will be decontaminated with a pressure washer or steam cleaner and then air dried.

4.5 Investigation-Derived Wastes (IDW)

Disposable personnel protective equipment and sampling equipment will be bagged, drummed, labeled, and left onsite. Purge and decontamination water and drill cuttings will be drummed and left onsite. Field screening and laboratory waste will be segregated according to waste stream, drummed, and stored onsite. All IDW remaining onsite will be placed in a secure location until appropriate disposal is arranged.

4.6 Schedule of Activities

The proposed schedule of work is as follows:

Activity	Anticipated Level of Effort		
Pre-mobilization, analytical setup	1 week		
Site assessment activities	3 weeks		
Analytical reporting	4 weeks		
Data validation	4 weeks		
Report generation	4 weeks		

5.0 Quality Assurance/Quality Control Requirements

5.1 Analytical Parameters

The types of analyses required for the satisfactory completion of this project have been determined by the OSC. Analytical parameters are summarized by sample types and quantities in Table 5.

5.2 Quality Control Measures

Quality control checks for sample collection will be accomplished by a combination of collocated/replicate samples; background samples; rinsate blank samples; chain-of-custody protocols; and laboratory quality assurance.

Quality control measures for laboratory screening will include: collect and field analyze uncontaminated sample from site matrix to document matrix effect; for each batch of 20 samples, one blind duplicate will be analyzed to document method repeatability; on a daily basis, one extract spike on a sample previously determined to be below the lowest test level will be performed and analyzed; on a daily basis, a performance evaluation sample will be analyzed to document method/operator performance.

At least 10 percent of all of the samples analyzed by laboratory screening methods onsite will be submitted to the analytical laboratory for confirmatory analysis of the field screened analytes by an EPA-approved laboratory method. Samples submitted for confirmatory analyses will be selected to represent the response range of the field analyses (samples that tested below the lowest level, above the upper test level, and if applicable, between two test levels).

To assess the effectiveness of the decontamination procedures on the Geoprobe large bore sampler and the drill rig split spoon sampler, a final rinsate blank sample will be

Table 5 QA/QC Analysis and Objective Summary							
			S	pikes	QA/QC		
Matrix*	Analytical Parameter	Analytical Method (ref)	Matrix ¹	Surrogate ²	Detect Limits ³	DQO ⁴	
S SD	ТРАН	CL-EPA 8270 SIM	10 ES 4/4	10 PE 34	10 ppm 1 ppm	QA-2	
S SD	PCBs	CL-EPA 8080	10 ES 3/3	10 PE 24	1 ppm 0.5 ppm	QA-2	
S SD	Cyanide	CL-EPA 335.2	17 4/4	10 PE NA	0.5 ppm 0.5 ppm	QA-2	
S SD	Metals	CL-EPA 6010 CL-EPA 7470	37/37	NA	1 ppm 0.2 ppm	QA-2	
S SD	Fluoride	CL-EPA 340.2	NA	NA	1 ppm	QA-2	
W	SOC + all PAHs	CL-EPA 8270 SIM	3/3	25	same	QA-2	
W	Cyanide	CL-EPA 335.2 Cl-335.1	3/3	NA .	same	QA-2 QA-3	
A	Inorganics PAHs, PCBs TSP	CL-EPA 6010A/7000 CL-EPA 8270A, 8310, 8080 FS-field method	3/3 3/3 NA	NA 140 NA	low conc.	QA-2	

Notes:

*=Matrix: S = soil; W = water; O = oil; DS = drummed solids; DL = drummed liquids; TS = tank solids; TL = tank liquids; A = air; SD = sediments; X = other

1=Matrix Spike/Matrix Spike Duplicate: at a rate of 1 per 10 samples for QA 2 and 1 per 5 samples for QA 3. For laboratory screening the extract will be spiked.

2=1 for each sample for QA 2 and QA 3 (otherwise specify NA). PE = Performance Evaluation Sample—No surrogate required in screening analysis.

3=To be determined at the time that laboratory selection is made.

4=Data Quality Objective for analysis (enter QA 1, QA 2, or QA 3).

FS=Field Screening; ES = Extract Spike; CL = Commercial Laboratory; SOC = Synthetic Organic Compounds; IOC = Inorganic Compounds; SD = Sediment.

collected from each piece of equipment listed above at least once each day that sampling is being conducted.

5.3 Data Quality Assurance Review

The data validation review of data packages will include an evaluation of: the information provided on the analytical data sheets and required support documentation for all sample analyses; the supporting sample collection documentation, including chain-of-custody; and field instrument calibration and/or performance check documentation (if required by method). The QA review will also examine adherence to the procedures as described in the cited SOPs and the requested analytical methods.

6.0 Deliverables

Laboratory deliverables will be as specified in the Quality Assurance Objectives Section (Section 3.0), in ARC/INFO format.

Reynolds Metals' Project Manager will provide an interim update to the OSC within 2 weeks after the completion of the field work that will include preliminary data tables, a site map, and a verbal debriefing.

The Reynolds Metals Project Manager will provide a site assessment report within 12 weeks of project completion.

7.0 Data Validation

The data validation requirements for each DQO specified in Table 5 are included in the Interim Final Guidance for the Quality Assurance/Quality Control for Removal Activities (EPA, 1990c).